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ULTRASONIC INSPECTION RESULTS FOR DOUBLE-SHELL TANK 241-AP-102 - FY 2005

CHRIS E. JENSEN

CH2M HILL HANFORD CORP.

Richland, WA 99352

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Abstract: This report documents the ultrasonic examination of 241-AP-102. There were two areas of Plate No. 2 that showed reportable wall thinning to a maximum of 14% of nominal wall thickness and five areas of thinning in the weld heat affected zones in Plate No. 4 to a maximum depth of 13% of nominal wall thickness. There were no crack like indications nor reportable pitting indications detected in any of the weld heat affected zones or wall courses.

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ULTRASONIC INSPECTION RESULTS FOR DOUBLE-SHELL TANK 241-AP-102 – FY 2005

C.E. Jensen

CH2M HILL Hanford Group, Inc.

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Ultrasonic Inspection Results for Double-Shell Tank 241-AP-102 – FY 2005

July 2005

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TERMS

AATT Absolute Arrival Time Technique

ASME American Society of Mechanical Engineers

CH2M HILL CH2M HILL Hanford Group, Inc.

CHAMPS Computerized History and Maintenance Planning System

COGEMA Engineering Corporation

dB Decibel

DSC Distance Sensitivity Calibration

DST double-shell tank

DSTIP Double-Shell Tank Integrity Project

FSH Full Screen Height

FY fiscal year

HAZ heat-affected zone

IIW International Institute of Welding

MHz Megahertz

NDE Nondestructive Examination
PDT Performance Demonstration Test
PNNL Pacific Northwest National Laboratory
RATT Relative Arrival Time Technique

RL U.S. Department of Energy, Richland Operations Office

RMS Root Mean Square

RUTI Remote Ultrasonic Test Instrument

T-SAFT Tandem Synthetic Aperture Focusing Technique

TWINS Tank Waste Information Network System

TWRS Tank Waste Remediation System

UT Ultrasonic Testing

WDOE Washington State Department of Ecology

EXECUTIVE SUMMARY

Background

Through FY 1999, six double-shell tanks were ultrasonically examined to meet the integrity requirements of the *Washington Administrative Code*, Chapter 173-303, "Dangerous Waste Regulations". Subsequent to the examinations, integrity assessment reports were issued for each double-shell tank farm and submitted to the Washington State Department of Ecology in FY 1999. In June 2000, the Washington State Department of Ecology issued Administrative Orders 00NWPKW-1250 and 00NWPKW-1251 providing prescriptive examination requirements for all double-shell tanks by FY 2005. In 2003, the Administrative Orders were incorporated into the Hanford Federal Facility Agreement and Consent Order, Milestones Series M-48. Milestone M-48-13 requires examination by September 30, 2005, of four DSTs not previously examined. This report documents the required ultrasonic examination of double-shell tank 241-AP-102, completed in the second quarter of FY 2005.

Methodology

The primary tank wall examinations consisted of 30 or 34 inch vertical strips. Each strip consisted of two ultrasonic examination scans – two 17-inch scans for plate #1, and two 15-inch scans for plates 2 through 5. The primary wall vertical examinations were looking for wall thinning, cracking, and pitting in the tank wall. The weld heat affected zones examined included 25 linear feet of vertical welds, and ~21 linear feet of horizontal welds. These examinations were performed using the P-scan nondestructive examination technique.

The ultrasonic examinations were carried out in accordance with ASME Boiler and Pressure Vessel Code, Section V, "Nondestructive Examinations". The personnel and non-destructive examination equipment were qualified to perform the examinations on the double-shell tanks by performance demonstration tests administered by Pacific Northwest National Laboratories.

The required accuracy for the ultrasonic examinations is to be within 0.020 inches for wall thinning, 0.050 inches for pitting, and 0.10 inches for cracking. The performance demonstration tests revealed that the examiners meet this requirement.

Results

Examination results of the vertical wall plates revealed 15 areas of wall thinning that exceeded the minimum thinning reportable level of 10% of the nominal thickness. Three areas of >10% thinning were found in plate #1, 6 areas in plate #2, and 6 areas in plate #3. However, the UT level III inspector determined that 13 of the 15 areas were considered to be pit-like and did not exceed the reportable pitting level of 25% of the nominal thickness. The two reportable thinning areas were discovered in plate #2 (Att. 2-15); one at the 23.3 foot tank elevation level, and the other at the 22.6 foot tank elevation level. These thinning regions covered a surface area of 0.06 in² and 0.18 in² respectively. The minimum thicknesses reported in these areas were 0.430 inches, which represent 86% of the nominal plate thickness.

There were neither crack-like indications nor reportable pit-like indications detected in any of the vertical wall plates.

The examination also revealed 19 areas of wall thinning in the weld heat-affected zones (HAZ) that exceeded the minimum thinning reportable level of 10% of the nominal thickness. Plate #2 had 8 thinning areas, and plate #4 had 11 thinning areas (Att. 2-31). However, the UT level III inspector determined that 14 of the 19 areas were considered to be pit-like and did not exceed the reportable pitting level of 25 % of the nominal thickness. The reportable thinning areas were discovered in the Heat Affected Zone (HAZ) of the vertical weld of plate #4 at approximately the 11 foot tank elevation level, and at approximately the 9 foot tank elevation level.

At the 11 foot level, three thinning areas were discovered; one was at the 11.3 foot tank elevation level, and the remaining two areas were at the 11.1 foot tank elevation level. These three thinning regions covered a surface area of 2.74 in², 4.82 in², and 0.29 in² respectively. The minimum thicknesses (0.651 in.), which represent 87% of the nominal plate thickness, were reported at the 11.3 foot and at the 11.1 foot tank elevation heights.

At the 9 foot level, two thinning areas were discovered; one was at the 9.2 foot tank elevation level, and the other was at the 9.1 foot tank elevation level. These two thinning regions covered a surface area of 0.035 in², and 0.064 in² respectively. The minimum thickness (0.656 in.), which represents 87% of the nominal plate thickness, was reported at the 9.2 foot tank elevation height. There were neither crack-like indications nor reportable pit-like indications detected in any of the weld heat-affected zones (HAZ). These zones included the primary tank vertical weld scans and the knuckle-to-shell horizontal weld scan.

Conclusions

Based on the results of this examination, the reportable wall thinning identified does not exceed the acceptance criteria of 20% wall thinning. Therefore, the material condition of the tank is satisfactory for continued operation.

The tanks inspected to date are summarized in the following table.

Double-Shell Tanks Inspected Through March 2005

Double- Shell	Inspection Year (FY)										
Tank	1997	1998	1999	2000	2001	2002	2003	2004	2005		
AN-101						х					
AN-102					х						
AN-105			х			(1)					
AN-106			Х	,							
AN-107		х									
AP-101							X (3)				
AP-102									х		
AP-103	·						X (4)				
AP-104							``	х	(1)		
AP-105							х				
AP-106									x		
AP-107				х							
AP-108				Х		(2)					
AW-101					х		-				
AW-102						х	(5)				
AW-103	х										
AW-104						x					
AW-105					х						
AW-106						x					
AY-101					х	x	(1)				
AY-102			x				` '				
AZ-101			х								
AZ-102							X (3)				
SY-101	7112.1.1.1						11(3)	x			
SY-102						<u> </u>		x	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
SY-103								x			

⁽¹⁾ Limited scope reexamination.

⁽²⁾ Linear indication evaluated.

⁽³⁾ Includes primary knuckle Synthetic Aperture Focusing Technique (T-SAFT) examination.

⁽⁴⁾ Linear indication detected; A follow-up inspection determined that it is a small area of incomplete fusion.

⁽⁵⁾ Primary knuckle T-SAFT examination only.

1.0 INTRODUCTION

In May 1996 the Tank Waste Remediation System (TWRS) Decision Board recommended, and U.S. Department of Energy, Richland Operations Office (RL) agreed, that the condition of the double-shell tanks (DST) should be determined by ultrasonic testing (UT) inspection of a limited area in six of the 28 DSTs (Figure 1-1). The Washington State Department of Ecology (WDOE) agreed with the strategy of limited ultrasonic inspection of DSTs. Data collected during the UT inspections will be used to assess the condition of the tank, judge the effects of past corrosion control practices, and satisfy a regulatory requirement to periodically assess the integrity of waste tanks.

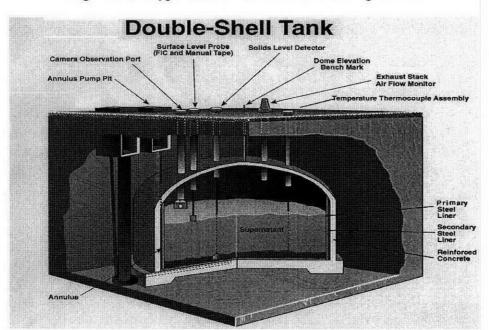


Figure 1-1. Typical Double-Shell Tank Configuration

In November 1996, DST 241-AW-103 was the first tank inspected to determine if Hanford DST walls could be inspected without removing the existing surface rust and scale. Equipment similar to that used to perform routine inspections of oil tanks and large pipelines was used. UT sensors were mounted on a remote-controlled crawler that used magnetic wheels to affix itself and move about on the tank walls. The crawler was deployed into the tank annulus and vertically traversed the primary and secondary containment walls to collect data on the wall thickness and the size of any pits or cracks. The successful completion of this inspection met the requirements of RL Milestone T21-97-455 and represented the first UT inspection of a Hanford DST (Final Report - Ultrasonic Examination of Tank 241-AW-103 Walls, Leshikar 1997).

In fiscal year (FY) 1998, FY 1999, and FY 2000, similar inspections were performed per Engineering Task Plans HNF-2820 (Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks, Pfluger 1999) and RPP-5583 (Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks - FY2000, Jensen 2000) on 241-AN-107, 241-AN-106, 241-AN-105, 241-AY-102, 241-AZ-101, 241-AP-107, and 241-AP-108. An

attempt was made to examine 241-AY-101 in FY 1999, but corrosion product on the tank wall prevented reliable examination.

In June 2000, WDOE issued an Administrative Order requiring UT examinations of the remaining 20 DSTs through FY 2005 (Administrative Order No. 00NWPKW-1251, Failure to Comply with Major Milestone M-32 of the Tri-Party Agreement, Silver 2000). In 2003, the WDOE Administrative Order (Silver 2000) was incorporated into the Hanford Federal Facility Agreement and Consent Order Milestone Series M-48 (HFFACO 2003), requiring examination during each FY through FY 2005 of four DSTs not previously examined. Based on the results of the above listed eight DST inspections and per the Milestone Series M-48 (HFFACO 2003), engineering task plans were prepared for ultrasonic DST inspections scheduled for the subsequent fiscal years.

In FY 2001, UT inspections were performed on four DSTs: 241-AN-102, 241-AW-101, 241-AW-105, and 241-AY-101 (following cleaning of selected areas of the 241-AY-101 wall). These DSTs were examined per Engineering Task Plan RPP-6839 (Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks - FY2001, Jensen 2000a).

In FY 2002, UT inspections were performed on four more DSTs: 241-AN-101, 241-AW-102, 241-AW-104, and 241-AW-106. Also in FY 2002, a more extensive examination of 241-AY-101 was performed, and an examination of 241-AP-108 was limited to characterization of the linear indication found in FY 2000. In addition, a limited scope reexamination of the upper walls of tank 241-AN-105 was performed in FY 2002. These DSTs were examined per RPP-7869 (Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks - FY2002, Jensen 2002), and RPP-8867 (Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks 241-AP-108, 241-AY-101, and 241-AZ-102 - FY2002, Jensen 2002a).

In FY 2003, UT inspections were performed on four more DSTs: 241-AP-101, 241-AP-103, 241-AP-105, and 241-AZ-102. Also, a primary knuckle inspection on 241-AW-102 using the Tandem Synthetic Aperture Focusing Technique (T-SAFT) not completed during FY 2002 was completed in early FY 2003. In addition, a supplementary, limited scope examination of the tank 241-AY-101 secondary tank wall was completed. These DSTs were examined per RPP-11832 (Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks - FY2003, Jensen 2002b).

In FY 2004, UT inspections were performed on four more DSTs: 241-SY-101, 241-SY-102, 241-SY-103, and 241-AP-104. A limited scope examination of tank 241-AN-105 originally planned for FY 2004 was deferred until FY 2005. These DSTs were examined per RPP-17750 (Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks - FY2004, Jensen 2003).

In FY 2005, UT inspections were planned on four more DSTs: 241-AN-103, 241-AN-104, 241-AP-102, and 241-AP-106. Limited scope examinations of tanks 241-AN-101, 241-AN-105, 241-AP-104 and 241-SY-101 were also planned for FY 2005. These DSTs were to be examined per RPP-22571 (Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks - FY2005, Jensen 2005).

DST 241-AP-102 was the second of the four tanks selected for standard inspection in FY 2005 (the tank 241-AP-106 wall examinations have been completed). Inspection of tank 241-AP-102 was completed in the second quarter of FY 2005, and is the subject of this report. The services of COGEMA Engineering Corporation (COGEMA Engineering) were retained to provide UT examinations, procedures and inspectors, and report the inspection results. Examination of 241-AP-102 was performed with UT equipment provided by CH2M HILL Hanford Group, Inc. (CH2M HILL).

2.0 OBJECTIVE AND SCOPE

This report describes the inspection system, evaluates the inspection results, and documents findings with conclusions and recommendations. The inspections were conducted in accordance with the criteria and scope set forth in RPP-22571 (Jensen 2005) for the FY 2005 UT inspection of DST 241-AP-102.

3.0 INSPECTION EQUIPMENT DESCRIPTION

Crawler / Scanning Bridge Systems – The crawler is a remotely controlled device that delivers the ultrasonic transducers to the tank walls. The crawler used during most P-scan imaging weighs approximately 35 pounds and has dimensions (including its traveling bridge) of approximately 21 inches wide by 18 inches long by 6 inches high. The traveling bridge on the crawler can be outfitted with various ultrasonic transducer configurations (Figure 3-1).

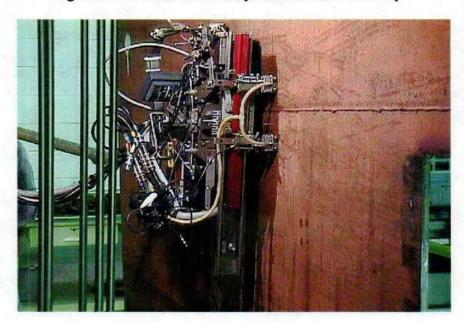


Figure 3-1. P-scan Crawler System on Tank Mock-up

The crawler system is deployed through a 24 inch annulus inspection riser using a customized deployment tool. The P-scan tank wall crawler attaches to the tank wall with two pairs of magnetic wheels. As the crawler moves slowly forward, the transducers glide from side-to-side over the tank wall surface. Water couplant is continuously fed to all transducers at a rate needed to maintain an acceptable signal.

Deployment Tool – A deployment tool was specifically designed to insert and retrieve the scanning system into and out of the DST annular space. The scanner sits on a platform that is manually lowered to the appropriate elevation. The platform has cables attached that can be controlled to move the scanner platform into contact with the examination surface. The scanner is then driven onto the surface. The deployment tool is retracted until the scanner needs to be removed from the annular space.

P-scan – P-scan is the name of the computerized pulse-echo ultrasonic inspection system used by the inspection vendor. The P-scan system is manufactured by Force Institute in Denmark. It acquires data from zero and angle beam transducers mounted on the crawler, allows real-time analysis, and records the data in electronic memory for post inspection analysis. Force Institute has designated "P-scan mode" to represent the angle beam (flaw length) view and "T-scan

mode" to represent the zero beam (thickness) view. T-scan mode is used for normal operation and, if crack-like indications are detected, then the P-scan mode is employed.

During normal T-scan and P-scan operations, the waveforms of the reflected sound wave signals for each transducer are displayed in the "A-scan monitoring mode". The displays are continuously monitored (but not saved), and are primarily used to verify that the transducers are functioning properly (e.g., there is proper probe contact, adequate water flowing, and correctly operating transducer cables). When an indication is detected, the area is rescanned using the "A-scan recording mode". The recorded A-scan waveforms are then reviewed off-line, serving as an additional tool in the evaluation of the indication.

Overview Camera – This camera was deployed to observe the area immediately around the inspection area and to aid crawler deployment in the annulus.

Side-view Camera – This camera and light system were installed in a riser adjacent to the inspection riser to provide an overall view of the inspection process.

Riser Enclosure – A modular structure that is placed over the inspection riser. This structure is used to combat adverse weather conditions and supplies an internal hoist for deployment of equipment.

Data Acquisition Control Center – A pull-type trailer was used to house the crawler controls, video monitors, and data collection and evaluation hardware. The trailer was located inside the AP Tank Farm boundary fence.

4.0 UT INSPECTION DESCRIPTION

The following is the description of the data collection methodology:

Tank inspection was performed under Computerized History and Maintenance Planning System (CHAMPS) work package number 2E-04-2394. All work steps, guidelines, procedures, personnel responsibilities, and protocol for the inspection (Jensen 2005) were included in the subject work package. The COGEMA Engineering procedure that establish the methods, equipment and requirements for the P-scan imaging system UT measurements and flaw detection is *Automated Ultrasonic Examination For Corrosion And Cracking*, COGEMA-SVUT-INS-007.3 (Attachment 1).

One type of remote crawler systems was utilized for the various DST 241-AP-102 inspections:

<u>P-scan Crawler for Tank Walls</u> - A remotely controlled, steerable crawler was used to deliver the P-scan UT transducers to the tank wall (Figure 3-1). The crawler was deployed through the 24 inch diameter annulus inspection Riser Number 030 to perform the vertical wall scans and the vertical and horizontal weld scans.

The P-scan crawler inspects the primary tank wall using one dual-element 0° transducer to detect wall thinning and corrosion pitting, and two 45° shear-wave transducers to detect cracking transverse to the scanning direction. This examination setup is illustrated in the Figure 4-1 schematic.

Top View (Transducers Only) Side View Crawler Crawler Scan Scan Travel Travel Direction Direction Direction O Direction х Bridge Fixture Transducers Tank ٥٥ Wall 45° Angle-beam 0º Straight-beam Transducers Transducer Tank Wall

Figure 4-1. Schematic of UT Setup for Vertical Wall Inspection

4-1

Vertical Wall Inspection Setup — Uses two 45° Transducers and one 0° Transducer (Inspect for Wall Thinning, Pitting and Axial Cracks)

Note that the examination of the welds and heat affected zones (HAZ) actually consist of angle beam examinations in the HAZ. The welds are not directly examined since the physical configuration does not permit transducer placement on the weld. This physical configuration is the weld crown. The DSTs were not designed or fabricated for in-service inspection, and therefore the weld crowns were not prepared for examination.

To detect cracks parallel to the weld, a 60° shear-wave transducer was directed toward the weld and a dual-element 0° transducer is also included to detect wall thinning and corrosion pitting (Figure 4-2). The examination of the HAZ using 60° angle beams will provide some coverage of the actual weld to the inside surface. For example, in a previous UT examination, a "lack of fusion" in a weld was identified (*Ultrasonic Inspection Results for Double-Shell Tank* 241-AP-103, Jensen 2003a).

Top View (Transducers Only) Side View Crawlet Crawler Scan Scan Travel Travel Direction Direction Direction Direction х Bridge Fixture Weld Transducers Transducers Weld 60° 60° 0° Straight-beam 0. (00) 60º Angle-beam Transducer Transducer Tank Cracks

Figure 4-2. Schematic of UT Setup for First Pass of Weld Inspections

First Pass of Vertical and Horizontal Weld Inspection – Uses two 60° Transducers and two 0° Transducers (Inspect for Wall Thinning, Pitting and HAZ Cracks Parallel to the Weld)

To detect cracks oriented perpendicular to welds, two opposing 45° shear-wave transducers were directed parallel to the weld. Welds were examined from both sides of the weld crown (Figure 4-3).

Top View (with Bridge Fixture) Top View (Transducers Only) Crawler Crawler Scan Scan Travel Travel Direction Direction ___ Direction Direction Υ Bridge 45° Angle-Crack **Fixture** beam Transducers 450 Tank Tank Wall Wall

Figure 4-3. Schematic of UT Setup for Second Pass of Weld Inspections

Second Pass of Vertical and Horizontal Weld Inspection — Uses four 45° Transducers (Inspect for Heat-Affected Zone Cracks Perpendicular to the Weld)

Data and images from the P-scan crawler were returned to a nearby control center located inside the tank farm fence. The control center contained the crawler controls, video monitors, and data collection and evaluation software and hardware. The UT inspector continuously monitored the signals for reportable indications.

5.0 INDICATION REPORTING CRITERIA

COGEMA Engineering was required to report to the customer the following anomalies:

- Wall thinning that exceeded 10 percent of the nominal wall thickness
- Pit depths that exceeded 25 percent of the nominal wall thickness
- Cracks that exceeded 0.1 inch in depth

The reporting criteria is established to identify indications that should be tracked. This tracking is to be used to determine if there is any active mechanism causing additional thinning, pit growth, or crack growth, based on subsequent examinations on the eight to ten year examination interval. The values are nominally 50% of the "acceptance criteria" established in *Acceptance Criteria for Non-Destructive Examination of Double-Shell Tanks* (Jensen 1995) and recommended in *Guidelines for Development of Structural Integrity Programs for DOE High-Level Waste Storage Tanks* (Bandyopadhyay et al. 1997).

For indications exceeding the "acceptance criteria", actions are initiated to evaluate the operability of the DST (Jensen 2005) through the occurrence reporting process. Indications exceeding the "reporting criteria" are reported to the CH2M HILL Project Engineer to be documented in the inspection report (Jensen 2005).

6.0 PERFORMANCE DEMONSTRATION TESTS

Prior to field use, COGEMA Engineering personnel satisfactorily completed a performance demonstration test (PDT). The test was conducted to qualify personnel, test procedures, and ensure the equipment's ability to detect and size wall thinning, pits, and cracks in a series of test plates with artificial defects. The performance demonstration test was performed on a tank mock-up in the 306E Facility located in the Hanford Site 300 Area. This mock-up also demonstrated the successful deployment and retrieval of the equipment. The PNNL report, "Report on Performance Demonstration Test – PDT, May 2000," (Attachment 3 of Ultrasonic Inspection Results of Double-Shell Tank 241-AP-108, Jensen 2000b) provides the details of the complete evaluation of the P-scan system PDT.

7.0 TANK 241-AP-102 HISTORY

The 241-AP Tank Farm consists of eight DSTs located in the 200 East Area of the Hanford Site. These underground tanks were built from 1983 through 1986, and are 75 feet in diameter with an operating capacity of 1.160 million gallons.

Tank 241-AP-102 entered service in the third quarter of 1986 with a volume of flush water. In 1988 the tank nearly reached capacity with dilute phosphate waste and waste from miscellaneous sources. The tank served as the feed tank for the Grout Treatment Facility and was equiped with a mixer pump to blend grout feed. The tank was nearly emptied from the third quarter of 1988 to the third quarter of 1989 during Grout Campaign 101. It was then filled with 1.104 million gallons of waste from tank 241-AN-106 in 1992. (*Tank Characterization Report for Double-Shell Tank 241-AP-102*, Baldwin 1997).

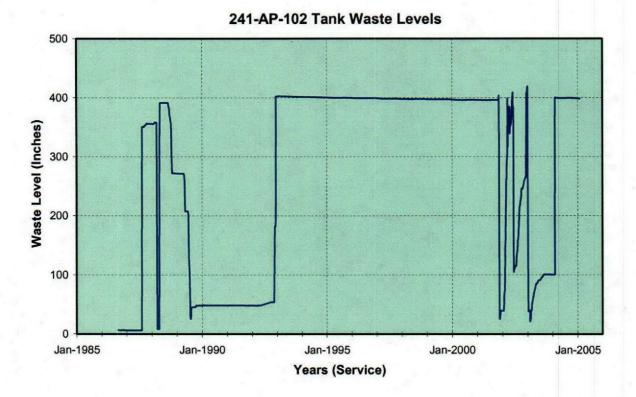
In November 2001, 1.039 million gallons were transferred to tank 241-AP-106 to free up storage space in tank 241-AP-102 to receive and store cross-site transfer waste (*Waste Tank Summary Report for Month Ending November 30, 2001*, Hanlon 2002). Similar transfers were conducted through early 2004.

Tank 241-AP-102 currently contains approximately 1.097 million gallons of waste equivalent to a level of approximately 399 inches: 1.074 million gallons of supernatant (391 inches), and 23,000 gallons of sludge (8 inches). The tank is categorized as sound. (Waste Tank Summary Report for Month Ending January 31, 2005, Hanlon 2005).

The waste level history since September 1986 is shown in Figure 7-1, based on data obtained from the Tank Waste Information Network System (TWINS)¹.

TWINS, http://twins.pnl.gov/twins.htm, queried 02/08/2005 [Data Source: Measurements, SACS, Surface Level, Tank Name AP-102, All Measurement Date values]

Figure 7-1. Waste Level History of Double-Shell Tank 241-AP-102



Since 1988, the minimum recorded waste level was approximately 8.4 inches (March and April 1988), and the maximum recorded waste level was approximately 419 inches (January 2002). During the nearly nine year period between December 1992 and November 2001, the waste level remained relatively constant, averaging 398 inches. Since February 2004, the waste level has also been relatively constant, averaging 399 inches.

Since July 1989, recorded temperatures of the tank have ranged from a maximum of 110°F (March 2002) to a minimum of 42°F (May 1993), and have averaged 71°F. This is based on data obtained from the TWINS².

TWINS, http://twins.pnl.gov/twins.htm, queried 02/03/2005 [Data Source: Measurements, SACS, Tank Temperature Readings, Tank Name AP-102, All Measurement Date values.

8.0 GENERAL REQUIREMENTS AND INSPECTION SCOPE

FY 2005 Contract Number 21186, Release 12, specifies that the contractor provide (among others) the following deliverables to the Double-Shell Tank Integrity Project (DSTIP) organization:

- The contractor shall provide AP-102 Non-Destructive Examination (NDE) Support and Data Analysis
- The contractor shall prepare recommended engineering reports and studies as directed by the DSTIP project leads

The areas on the primary tank that were identified for UT inspection in the engineering task plan (Jensen 2005) and work package number 2E-04-2394 are described below.

Primary Tank Wall and Welds:

- A vertical strip (approximately 30 inches wide by 35 feet long) of the primary wall between the upper haunch transition and the lower knuckle for pits, cracks, and wall thinning. The vertical strip may be comprised of one or more strips whose total width is 30 inches.
- Twenty feet of the circumferential weld joining the cylinder to the lower knuckle, one vertical weld joining the lowest shell plate plates (about 10 feet of weld), and one vertical weld joining the next to the lowest shell plates (about 10 feet of weld). A minimum of twenty (20) feet of vertical weld shall be examined.

9.0 EQUIPMENT SETUP AT AP TANK FARM

Prior to performing the actual inspection, the shield plug was removed from the 24 inch Riser 030, and a temporary cover and riser extension were secured to the riser. A portable enclosure was installed over the riser to provide the means for deploying the UT equipment and protecting the operators from the weather. An electric chain hoist, mounted to the roof frame, was used for maneuvering the equipment into position. The control center trailer was set up inside the AP Tank Farm's boundary fence, and the control cables were run along the ground to the equipment located at the riser. A typical tank farm setup for the AP-Farm is shown in Figure 9-1.



Figure 9-1. Field Set-Up at Riser for Double-Shell Tank on AP-Farm

10.0 INSPECTION RESULTS

Tank 241-AP-102 was fabricated from carbon steel plate. The primary tank's exterior surface varies from mill scale to coatings of various degrees of rust caused by in-service corrosion of carbon steel. A description of the plates is as follows with the location of the plates as shown in Figure 10-1 (*Tank Cross Section 241-AP Tanks*, Braun-Hanford 1986).

Primary Knuckle (top) - Connects dome of tank to side-wall

Primary wall – Consists of (from top to bottom)

Plate #1 – approximately 7 feet 8 inch tall, 1/2 inch nominal thickness

Plate #2 – approximately 7 feet 8 inch tall, 1/2 inch nominal thickness

Plate #3 – approximately 7 feet 8 inch tall, 9/16 inch nominal thickness

Plate #4 – approximately 9 feet tall, 3/4 inch nominal thickness

Plate #5 – approximately 2 feet tall, 7/8 inch nominal thickness

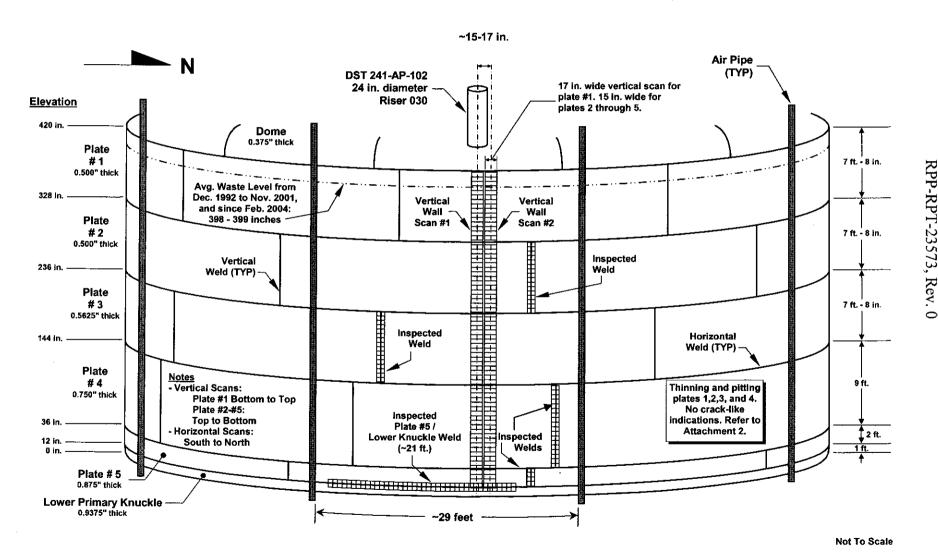
Primary Knuckle (bottom) – Approximately 15/16 inch nominal thickness. Connects sidewall of tank to primary tank bottom.

Primary Tank Bottom – Connected to primary knuckle. The outer three feet is approximately 7/8 inch nominal thickness, transitioning to 1/2 inch nominal thickness.

The P-scan crawler was deployed through the 24 inch diameter annulus inspection Riser 030 at the east side of tank 241-AP-102 for examinations of the primary tank wall, and the vertical and horizontal welds. All tank welds examined were in the "as-welded" condition. The various scan paths for the crawlers are shown in Figure 10-1, along with other pertinent tank information.

The UT P-scan data were examined by COGEMA Engineering's Level III certified inspector and by Limited Level II certified inspectors. The Limited Level II inspectors were "P-scan Limited", indicating that they are qualified to collect and examine the P-scan data, but are not qualified to interpret the data.

Figure 10-1. Schematic of UT Scan Paths on East Side of Tank 241-AP-102 Wall (via Riser 030)



The following pages contain tables that present summary and detailed wall thickness data, which were derived from the COGEMA "Automated Ultrasonic Thickness Data Report Sheets". The inspection data sheets, the transducer calibration sheets, the original tank wall and weld scan map, and an interpretation of the data by an independent Level III certified NDE Inspector are included in Attachment 2 for the P-scan data.

Tables 10-1 through 10-4 show the summarized minimum wall thickness values obtained using the P-scan system on the primary tank vertical walls, vertical plate welds, and horizontal knuckle weld. Although the data are reported to three significant figures, the accuracy of the wall thickness data, based on the results of the performance demonstration test, is 0.012 inch root-mean-square (RMS).

Table 10-1. Summary of Primary Tank Wall Scan 1 (via Riser 030)

Plate Description	Elevation of Wall Scan (inches)	Wall Scan Distance (inches) ⁽¹⁾	Design Nominal (inches)	Measured Minimum (inches)	Scan Minimum % of Nominal
Plate #1	419 to 328.5	90.46	0.500	0.453	90.6%
Plate #2	327 to 240.4	86.6	0.500	0.476	95.2%
Plate #3	235 to 145.6	89.4	0.5625	0.489	86.9%
Plate #4	143 to 38.3	104.7	0.750	0.696	92.8%
Plate #5	35 to 13.1	21.9	0.875	0.795	90.9%

⁽¹⁾ Plate #1 scan width was 17 inches, plates 2 through 5 scan widths were 15 inches.

Table 10-2. Summary of Primary Tank Wall Scan 2 (via Riser 030)

Plate Description	Elevation of Wall Scan (inches)	Wall Scan Distance (inches) ⁽¹⁾	Design Nominal (inches)	Measured Minimum (inches)	Scan Minimum % of Nominal
Plate #1	419 to 328.7	90.3	0.500	0.428	85.6%
Plate #2	327 to 238.5	88.5	0.500	0.416	83.2%
Plate #3	235 to 145.8	89.2	0.5625	0.505	89.8%
Plate #4	143 to 38.4	104.6	0.750	0.684	91.2%
Plate #5	35 to 13.7	21.3	0.875	0.790	90.3%

⁽¹⁾ Plate #1 scan width was 17 inches, plates 2 through 5 scan widths were 15 inches.

Table 10-3. Summary of Primary Tank Weld Scans (via Riser 030)

Weld Description	Elevation of Weld Scan (inches)	Weld Scan Distance (inches) ⁽¹⁾	Design Nominal (inches)	Measured Minimum (inches)	Scan Minimum % of Nominal
Vertical Weld Plate #2	327 to 237.5	89.5	0.500	0406	81.2%
Vertical Weld Plate #3	235 to 147.4	87.6	0.5625	0.515	91.6%
Vertical Weld Plate #4	143 to 39.3	103.7	0.750	0.630	84.0%
Vertical Weld Plate #5	35 to 14.5	20.5	0.875	0.802	91.7%

⁽¹⁾ Scan widths were 10.5 – 11.9 inches.

Table 10-4. Summary of Plate #5 / Knuckle Horizontal Weld Scans (via Riser 030)

Weld Description	Vertical Location of Weld Scan	Weld Scan Distance (inches) (1)(2)	Design Nominal (inches)	Measured Minimum (inches)	Scan Minimum % of Nominal
Horizontal Weld Plate #5 to Knuckle, Plate #5 Side	From ~1 in. to ~5.5 in. above Plate #5 / Knuckle Weld	262.2	0.875	0.805	92.0%
Horizontal Weld Plate #5 to Knuckle, Knuckle Side	From ~1 in. to ~5.5 in. below Plate #5 / Knuckle Weld	249.6	0.9375	0.901	96.1%

⁽¹⁾ Scan widths were 9.3 to 11.0 inches

Tables 10-5 through 10-14 contain the detailed data for wall scans as presented in 12 inch long by 15 to 17 inch wide connecting scans. The detailed data for vertical and horizontal welds are presented in 12 inch long by 9.3 to 11.9 inch wide scans in Tables 10-15 through 10-20.

Table 10-5. Primary Tank Vertical Wall Scan 1 – Plate #1 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	419	0 – 12 (1)	0.500	0.505	0.465
	407	12 – 24	0.500	0.505	0.478
	395	24 – 36	0.500	0.510	0.506
Scan "Vert. Wall / Plate 1"	383	36 – 48	0.500	0.510	0.506
(Page Att. 2-3)	371	48 – 60	0.500	0.510	0.506
(1480111112)	359	60 – 72	0.500	0.510	0.505
	347	72 – 84	0.500	0.510	0.465
	335	84 –90.46	0.500	0.505	0.453

⁽¹⁾ Scan start was 1 inch below the centerline of the first horizontal weld, and centerline of 24 inch Riser 030; Scan width was 17 inches.

⁽²⁾ Surface conditions prevented obtaining thickness measurements along a portion of the knuckle-side of the horizontal weld (see attachment 2, pg 2-35.

Table 10-6. Primary Tank Vertical Wall Scan 1 - Plate #2 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	327	0 – 12 (1)	0.500	0.490	0.476
	315	12 – 24	0.500	0.495	0.483
Scan	303	24 – 36	0.500	0.495	0.483
"Vert. Wall / 0 /	291	36 – 48	0.500	0.495	0.490
Plate 2"	279	48 – 60	0.500	0.495	0.482
(Page Att. 2-5)	267	60 – 72	0.500	0.495	0.478
	255	72 – 84	0.500	0.495	0.478
	243	84 – 86.6	0.500	0.490	0.482

⁽¹⁾ Scan start was 1 inch below the centerline of the second horizontal weld, and centerline of 24 inch Riser 030; Scan width was 15 inches.

Table 10-7. Primary Tank Vertical Wall Scan 1 - Plate #3 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	235	0 – 12 (1)	0.5625	0.558	0.489
	223	12 – 24	0.5625	0.560	0.507
Scan	211	24 – 36	0.5625	0.560	0.503
"Vert. Wall / 0 /	199	36 – 48	0.5625	0.565	0.513
Plate 3"	187	48 – 60	0.5625	0.565	0.514
(Page Att. 2-7)	175	60 – 72	0.5625	0.565	0.506
	163	72 – 84	0.5625	0.565	0.513
	151	84 – 89.4	0.5625	0.560	0.491

⁽¹⁾ Scan start was 1 inch below the centerline of the third horizontal weld, and centerline of 24 inch Riser 030; Scan width was 15 inches.

Table 10-8. Primary Tank Vertical Wall Scan 1 – Plate #4 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	143	0 – 12 (1)	0.750	0.740	0.706
	131	12 – 24	0.750	0.740	0.734
	119	24 – 36	0.750	0.740	0.734
Scan "Vert. Wall / 0 /	107	36 – 48	0.750	0.740	0.726
Plate 4"	95	48 60	0.750	0.740	0.722
(Page Att. 2-9)	83	60 – 72	0.750	0.740	0.732
	71	72 – 84	0.750	0.740	0.696
	59	84 – 96	0.750	0.735	0.701
	47	96 – 104.7	0.750	0.735	0.697

⁽¹⁾ Scan start was 1 inch below the centerline of the fourth horizontal weld, and centerline of 24 inch Riser 030; Scan width was 15 inches.

Table 10-9. Primary Tank Vertical Wall Scan 1 – Plate #5 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
Scan "Vert. Wall / 0 / Plate 5"	35	0 – 12 (1)	0.875	0.860	0.795
(Page Att. 2-11)	23	12 – 21.9	0.875	0.860	0.847

⁽¹⁾ Scan start was 1 inch below the centerline of the fifth horizontal weld, and centerline of 24 inch Riser 030; Scan width was 15 inches.

Table 10-10. Primary Tank Vertical Wall Scan 2 - Plate #1 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	419	0 – 12 ⁽¹⁾	0.500	0.490	0.440
	407	12 – 24	0.500	0.490	0.473
	395	24 – 36	0.500	0.495	0.492
Scan "Vert, Wall / 2 nd / Plate 1"	383	36 – 48	0.500	0.500	0.492
(Page Att. 2-13)	371	48 – 60	0.500	0.500	0.471
(1 ago 11 2 13)	359	60 – 72	0.500	0.500	0.492
	347	72 – 84	0.500	0.495	0.441
	335	84 –90.3	0.500	0.495	0.428

⁽¹⁾ Scan start was 1 inch below the centerline of the first horizontal weld, and 20 inches north of Scan 1, centerline to centerline; Scan width was 17 inches.

Table 10-11. Primary Tank Vertical Wall Scan 2 - Plate #2 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	327	0 – 12 (1)	0.500	0.490	0.479
	315	12 – 24	0.500	0.490	0.440
C ((3.7 337-11 /	303	24 – 36	0.500	0.490	0.479
Scan "Vert. Wall / 2 nd / Plate 2"	291	36 – 48	0.500	0.490	0.430
(Page Att. 2-15)	279	48 – 60	0.500	0.490	0.430
(= 100	267	60 – 72	0.500	0.490	0.487
	255	72 – 84	0.500	0.490	0.438
	243	84 – 88.5	0.500	0.485	0.416

⁽¹⁾ Scan start was 1 inch below the centerline of the second horizontal weld, and 17 inches north of Scan 1, centerline to centerline; Scan width was 15 inches.

Table 10-12. Primary Tank Vertical Wall Scan 2 - Plate #3 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	235	0 – 12 (1)	0.5625	0.565	0.505
	223	12 – 24	0.5625	0.565	0.506
Scan "Vert. Wall /	211	24 – 36	0.5625	0.565	0.509
2 nd / Plate 3"	199	36 – 48	0.5625	0.565	0.507
(Page Att. 2-17)	187	48 – 60	0.5625	0.565	0.510
	175	60 – 72	0.5625	0.565	0.512
	163	72 –84	0.5625	0.565	0.507
	151	84 –89.2	0.5625	0.565	0.515

⁽¹⁾ Scan start was 1 inch below the centerline of the third horizontal weld, and 17 inches north of Scan 1, centerline to centerline; Scan width was 15 inches.

Table 10-13. Primary Tank Vertical Wall Scan 2 - Plate #4 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	143	0 – 12 ⁽¹⁾	0.750	0.740	0.684
	131	12 – 24	0.750	0.740	0.736
	119	24 – 36	0.750	0.740	0.684
Scan "Vert. Wall /	107	36 – 48	0.750	0.740	0.690
2 nd / Plate 4"	95	48 – 60	0.750	0.740	0.729
(Page Att. 2-19)	83	60 – 72	0.750	0.740	0.691
	71	72 – 84	0.750	0.740	0.731
	59	84 – 96	0.750	0.740	0.684
	47	96 – 104.6	0.750	0.735	0.712

⁽¹⁾ Scan start was 1 inch below the centerline of the fourth horizontal weld, and 17 inches north of Scan 1, centerline to centerline; Scan width was 15 inches.

Table 10-14. Primary Tank Vertical Wall Scan 2 - Plate #5 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Wall Scan (inches)	Vertical Location of Wall Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
Scan "Vert. Wall / 2 nd / Plate 5"	35	0 – 12 (1)	0.875	0.855	0.809
(Page Att. 2-21)	23	12 – 21.3	0.875	0.855	0.790

⁽¹⁾ Scan start was 1 inch below the centerline of the fifth horizontal weld, and 17 inches north of Scan 1, centerline to centerline; Scan width was 15 inches.

Table 10-15. Primary Tank Vertical Wall Weld Scan - Plate #2 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Weld Scan (inches)	Vertical Location of Weld Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	327	0 – 12 (1)	0.500	0.495	0.445
	315	12 – 24	0.500	0.495	0.426
Scan	303	24 – 36	0.500	0.495	0.440
"Vert. Weld/	291	36 – 48	0.500	0.495	0.424
Plate 2"	279	48 – 60	0.500	0.495	0.440
(Page Att. 2-27)	267	60 – 72	0.500	0.495	0.430
	255	7 2 – 84	0.500	0.495	0.426
	243	84 – 89.5	0.500	0.490	0.406

⁽¹⁾ Scan start was 1 inch below the centerline of the second horizontal weld; Scan width was 10.5 inches.

Table 10-16. Primary Tank Vertical Wall Weld Scan - Plate #3 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Weld Scan (inches)	Vertical Location of Weld Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	235	0 – 12 (1)	0.5625	0.585	0.518
	223	12 – 24	0.5625	0.585	0.522
Scan	211	24 – 36	0.5625	0.590	0.524
"Vert. Weld /	199	36 – 48	0.5625	0.590	0.519
Plate 3"	187	48 – 60	0.5625	0.590	0.528
(Page Att. 2-29)	175	60 – 72	0.5625	0.590	0.515
	163	72 – 84	0.5625	0.585	0.522
	151	84 – 87.6	0.5625	0.585	0.519

⁽¹⁾ Scan start was 1 inch below the centerline of the third horizontal weld; Scan width was 11.1 inches.

Table 10-17. Primary Tank Vertical Wall Weld Scan - Plate #4 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Weld Scan (inches)	Vertical Location of Weld Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
	143	0 – 12 (1)	0.750	0.730	0.651
	131	12 – 24	0.750	0.730	0.635
	119	24 – 36	0.750	0.730	0.656
Scan "Vert, Weld/	107	36 – 48	0.750	0.730	0.640
Plate 4"	95	48 – 60	0.750	0.730	0.630
(Page Att. 2-31)	83	60 – 72	0.750	0.730	0.641
	71	72 – 84	0.750	0.730	0.681
	59	84 – 96	0.750	0.730	0.657
	47	96 – 103.7	0.750	0.720	0.664

⁽¹⁾ Scan start was 1 inch below the centerline of the fourth horizontal weld; Scan width was 11.9 inches.

Table 10-18. Primary Tank Vertical Wall Weld Scan - Plate #5 (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Start of Weld Scan (inches)	Vertical Location of Weld Scan (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
Scan "Vert. Weld/	35	0 – 12 (1)	0.875	0.870	0.822
Plate 5" (Page Att. 2-33)	23	12 – 20.5	0.875	0.865	0.802

⁽¹⁾ Scan start was 1 inch below the centerline of the fifth horizontal weld; Scan width was 11.6 inches.

Table 10-19. Primary Tank Horizontal Weld - Plate #5 to Knuckle Scan, Plate #5 Side (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Horizontal Weld Scan (inches)	Horizontal Location of Weld Scan, Plate #5 Side (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
		0 – 12 (1)	0.875	0.860	0.853
		12 – 24	0.875	0.860	0.819
Scan	From ~1 in. to	24 – 36	0.875	0.860	0.827
"Horz. Weld /	~5.5 in. above	36 - 48	0.875	0.860	0.845
Plate / Knuckle"	Plate #5 / Knuckle Weld	48 – 60	0.875	0.860	0.854
(Page Att. 2-36)	Kildekie weld	60 - 72	0.875	0.860	0.805
		72 - 84	0.875	0.860	0.860
		84 – 84.6	0.875	0.860	0.860
		0 – 12 (2)	0.875	0.870	0.859
		12 – 24	0.875	0.865	0.858
		24 – 36	0.875	0.865	0.858
Scan	From ~1 in. to	36 – 48	0.875	0.865	0.859
"Horz. Weld /	~5.5 in. above	48 – 60	0.875	0.865	0.825
Plate / KnuckleA"	Plate #5 / Knuckle Weld	60 – 72	0.875	0.865	0.829
(Page Att. 2-38)	Kliuckie weid	72 – 84	0.875	0.870	0.861
•		84 – 96	0.875	0.870	0.861
		96 – 108	0.875	0.870	0.844
		108 – 120	0.875	0.870	0.859
		0 – 12 (3)	0.875	0.870	0.830
Scan "Horz. Weld /	From ~1 in. to	12 - 24	0.875	0.870	0.806
Plate / KnuckleB"	~5.5 in. above Plate #5 /	24 - 36	0.875	0.870	0.849
(Page Att. 2-41)	Knuckle Weld	36 - 48	0.875	0.865	0.829
		48 – 57.6	0.875	0.865	0.847

⁽¹⁾ Start of scan @ first air slot north of south air line south of 24 inch riser; Scan width was 11.0 inches.

⁽²⁾ Start of scan @ first vertical weld south of 24 inch riser; Scan width was 9.7 inches.

⁽³⁾ Start of scan @ vertical weld end of A; Scan width was 9.4 inches.

Table 10-20. Primary Tank Horizontal Weld - Plate #5 to Knuckle Scan, Knuckle Side (via Riser 030)

Scan I.D. Number (Data Sheets)	Elevation of Horizontal Weld Scan (inches)	Horizontal Location of Weld Scan, Knuckle Side (inches)	Design Nominal (inches)	Measured Average (inches)	Measured Minimum (inches)
		$0-12^{(1)(2)}$	0.9375	0.940	0.906
Scan	From ~1 in. to	12 – 24	0.9375	0.940	0.916
"Horz. Weld /	~5.5 in. below	24 - 36	.09375	0.940	0.878
Plate / Knuckle"	Plate #5 / Knuckle Weld	36 – 48	0.9375	0.940	0.905
(Page Att. 2-35)	Kliuckie Welu	48 – 60	0.9375	0.940	0.915
		60 – 72	0.9375	0.940	0.910
	From ~1 in. to	0 – 12 (3)	0.9375	0.970	0.947
		12 – 24	0.9375	0.970	0.943
		24 – 36	0.9375	0.970	0.929
Scan		36 – 48	0.9375	0.970	0.941
"Horz. Weld /	~5.5 in. below	48 – 60	0.9375	0.975	0.955
Plate / KnuckleA"	Plate #5 / Knuckle Weld	60 – 72	0.9375	0.975	0.951
(Page Att. 2-39)	Knuckie weid	72 – 84	0.9375	0.980	0.959
		84 – 96	0.9375	0.980	0.953
		96 – 108	0.9375	0.985	0.969
		108 – 120	0.9375	0.980	0.911
		0 – 12 ⁽⁴⁾	0.9375	0.930	0.901
Scan	From ~1 in. to	12 - 24	0.9375	0.930	0.886
"Horz. Weld / Plate / KnuckleB"	~5.5 in. below Plate #5 /	24 - 36	0.9375	0.935	0.910
(Page Att. 2-42)	Knuckle Weld	36 - 48	0.9375	0.935	0.918
		48 – 57.6	0.9375	0.935	0.912

⁽¹⁾ Start of scan @ first air slot north of south air line south of 24 inch riser; Scan width was 11.0 inches.

⁽²⁾ Surface conditions prevented obtaining thickness measurements along a portion of the knuckle-side of the horizontal weld (see attachment 2, pg 2-65 of 100).

⁽³⁾ Start of scan @ first vertical weld south of 24 inch riser; Scan width was 9.7 inches.

⁽⁴⁾ Start of scan @ vertical weld end of A; Scan width was 9.3 inches.

11.0 EVALUATION OF INSPECTION RESULTS

The results from the inspection of tank 241-AP-102 are evaluated and compared with results of all other tank ultrasonic inspections.

11.1 TANK 241-AP-102 UT DATA EVALUATION

The UT P-scan data were interpreted by W. H. Nelson, COGEMA Engineering's Level III certified inspector. The P-scan data were also examined by J. B. Elder, an independent Level III certified NDE Inspector. Mr. Elder independently evaluated the P-scan raw data and concurred with COGEMA Engineering's interpretation (Attachment 2). The P-scan data have also been evaluated by PNNL as a third party review. Their results and conclusions were found to be consistent with those described in this report. Their P-scan data review is *Ultrasonic Examination Of Double-Shell Tank 241-AP-102 - Examination Completed February 2005*, PNNL report number PNNL-15122, Rev. 0 (Attachment 3).

The results of the tank 241-AP-102 UT inspections indicated reportable wall thinning in plate#2, and the HAZ of the vertical weld in plate #4. Non-reportable pit-like indications were found in plates #1, #2, #3, and the HAZ of the vertical welds in plates #2 and #4. No reportable cracking was found in any of the areas examined. Figure 11-1 illustrates all of the "as-found" average wall thickness measurements of the primary tank vertical wall scans generated from the P-scan Inspection Data Sheets (Attachment 2). Each measurement plotted on Figure 11-1 is the average of all data collected over a 12 inch long by 15 inch wide scan area (17 inch wide for plate #1). Areas of interest for tank 241-AP-102 are the vapor space above the current liquid waste, the current liquid-vapor interface (approximately 33.3 feet or 399 inches), the liquid region, the liquid-solids interface (approximately 8 inches), and the solids region.

The overall average wall thickness measurements for the walls and weld HAZs are tabulated in Table 11-1. The UT data show that the primary tank average wall thickness values ranged from 97.2% to 104.4% of the nominal values specified in the design documents. The UT data, when compared to construction specifications, drawings, standards, and codes (241-AP Double-Shell Tanks Integrity Assessment Report, Jensen 1999), reveal that the as-found condition of the tank plates and welds are all within the allowable design limits. A summary of the results associated with the areas examined is presented below.

Primary Tank Wall: Two vertical strips encompassing Plate #1 through Plate #5 were examined. The overall average wall thickness of the two vertical strips ranged from 98.0% to 100.4% of the nominal thickness. Examination results of the vertical wall plates revealed 15 areas of wall thinning that exceeded the minimum thinning reportable level of 10% of the nominal plate thickness. Three areas of >10% thinning were found in plate #1, 6 areas in plate #2, and 6 areas in plate #3. However, the UT level III inspector determined that 13 of the 15 areas were considered to be pit-like and did not exceed the reportable pitting level of 25% of the nominal thickness. The two reportable thinning areas were discovered in plate #2; one at the 23.3 foot tank elevation level, and the other at the 22.6 foot tank elevation level (Att. 2-15). These thinning regions covered a surface area of 0.06 in² and 0.18 in² respectively. The minimum

thicknesses reported in these areas were 0.430 inches, which represent 86% of the nominal plate thickness. There were neither crack-like indications nor reportable pit-like indications detected in any of the vertical plates.

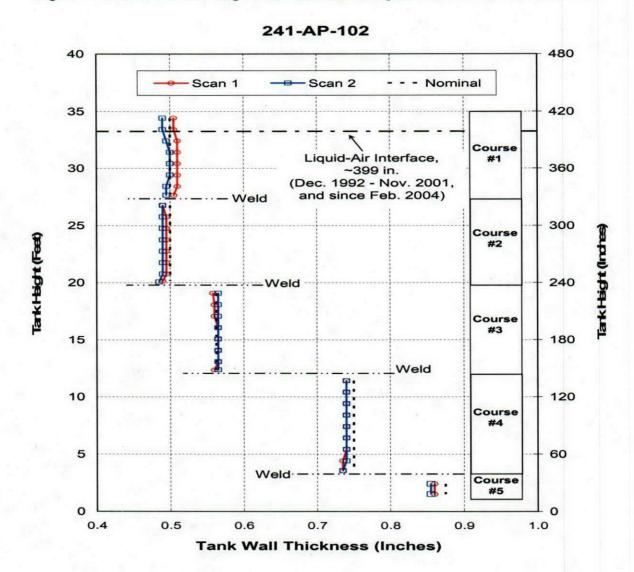


Figure 11-1. Scan Data Average Wall Thickness Compared to Nominal Plate Thickness

Primary Tank Welds: One vertical weld in each of plates 2 through 5 were examined. The average plate wall thicknesses adjacent to the welds' Heat Affected Zone (HAZ) ranged from 97.2% to 104.4% of their respective nominal thickness values. The examination revealed 19 areas of wall thinning in the (HAZ) that exceeded the minimum thinning reportable level of 10% of the nominal thickness. Plate #2 had 8 thinning areas, and plate #4 had 11 thinning areas. However, the UT level III inspector determined that 14 of the 19 areas were considered to be pit-like and did not exceed the reportable pitting level of 25 % of the nominal thickness. The reportable thinning areas were discovered in the Heat Affected Zone (HAZ) of the vertical weld of plate #4 at approximately the 11 foot tank elevation level, and at approximately the 9 foot tank elevation level (Att. 2-31).

At the 11 foot level, three thinning areas were discovered; one was at the 11.3 foot tank elevation level, and the remaining two areas were at the 11.1 foot tank elevation level. These three thinning regions covered a surface area of 2.74 in², 4.82 in², and 0.29 in² respectively. The minimum thicknesses (0.651 in.), which represent 87% of the nominal plate thickness, were reported at the 11.3 foot level and at the 11.1 foot tank elevation level.

At the 9 foot level, two thinning areas were discovered; one was at the 9.2 foot tank elevation level, and the other was at the 9.1 foot tank elevation level. These two thinning regions covered a surface area of 0.035 in², and 0.064 in² respectively. The minimum thickness (0.656 in.), which represents 87% of the nominal plate thickness, was reported at the 9.2 foot tank elevation height.

There were neither crack-like indications nor reportable pit-like indications detected in any of the weld heat-affected zones (HAZ). These zones included the primary tank vertical weld scans and the knuckle-to-shell horizontal weld scan.

Primary Tank Knuckle-to-Shell Weld: An approximately 20.8 foot region (Att. Pg 2-35, 2-36) of the horizontal knuckle-to-shell weld was examined. No crack-like indications were found. There were also no reportable wall thinning or pitting indications found. The plate wall thicknesses adjacent to the weld averaged 98.9% (plate side) to 101.9% (knuckle side) of their nominal thickness values.

Table 11-1.	Average	Tank	Wall	Thickness	Values
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Scan Description	Scan Location	Scan 1 Average (inches)	Scan 2 Average (inches)	Average Thickness (inches)	Nominal Thickness (inches)	Average minus Nominal (inches)
	Plate #1	0.5081	0.4956	0.5019	0.500	+ 0.002
Vertical	Plate #2	0.4938	0.4894	0.4916	0.500	-0.008
Wall	Plate #3	0.5623	0.5650	0.5636	0.5625	+ 0.001
Scans (1)	Plate #4	0.7389	0.7394	0.7392	0.750	-0.011
	Plate #5	0.8600	0.8550	0.8575	0.875	-0.018
	Plate #2	0.4944	n/a ⁽²⁾	0.4944	0.500	-0.006
Vertical	Plate #3	0.5875	n/a	0.5875	0.5625	+ 0.025
Welds	Plate #4	0.7289	n/a	0.7289	0.750	-0.021
	Plate #5	0.8675	n/a	0.8675	0.875	-0.008
Lower Primary Knuckle Weld	Plate #5 Side	0.8650	n/a	0.8650	0.875	-0.010
	Knuckle Side	0.9552	n/a	0.9552	0.9375	+ 0.018

⁽¹⁾ Scan 1 and Scan 2 were on the same plate, unless otherwise noted.

⁽²⁾ n/a – not applicable (only one scan performed)

11.2 DST ULTRASONIC INSPECTION DATA RESULTS COMPARISON

The following Tables 11-2 and 11-3 provide a summary of primary tank vertical wall inspection results and a comparison of primary tank wall thinning.

Table 11-2 reports the inspection results chronologically according to fiscal year (October 1 through September 30).

Table 11-2. Double-Shell Tanks Chronological Inspection Results Findings

Tank	Inspection Year (FY)	Reportable Plate Crack Indication	Reportable Plate Pitting	Reportable Plate Thinning	Reportable Weld Thinning, Pitting or Cracking
AW-103	1997	None	None	None	None
AN-107	1998	None	None	None	None
AN-106	1999	None	None	None	None
AN-105	1999	None	None	Two very minute areas of a plate (20% maximum reduction in thickness) (a)	None
AZ-101	1999	None	None	One area of a plate (11.4% maximum reduction in thickness)	None
AY-102	1999	None	None	None	None
AP-107	2000	None	None	None	None
AP-108	2000	None	None	Two minute areas of a plate (13.8% maximum reduction in thickness).	None (b)
AW-101	2001	None	None	A pit like indication in a very minute area of a plate (16% maximum reduction in thickness).	None
AW-105	2001	None	None	None	None
AY-101	2001	None	Pit-like indication at historical liquid-air interface	Some pit-like indications identified as thinning	Three areas of 10% wall thinning in vertical welds
AN-102	2001	None	None	One minute area of a plate (11% maximum reduction in thickness)	None
AN-101	2002	None	None	One small area of a plate (12 % maximum reduction in thickness)	Four local areas near vertical welds (14% maximum reduction in thickness)

(Cont. on next page)

Table 11-2. (Cont.) Double-Shell Tanks Chronological Inspection Results Findings

Tank	Inspection Year (FY)	Reportable Plate Crack Indication	Reportable Plate Pitting	Reportable Plate Thinning	Reportable Weld Thinning, Pitting or Cracking
AW-106	2002	None	None	One small area	10.4% maximum reduction in thickness
AY-101	2002	Not Investigated	None	72 areas of >10% wall thinning, most in the historical liquid-air interface in Plate #2 (20.2% maximum reduction in thickness)	Not Investigated
AW-104	2002	None	None	None	None
AW-102	2002 & 2003 ^(c)	None	None	None	None
AN-105	2002	None	None	None	Not Investigated
AP-101	2003	None	None	None	None
AP-105	2003	None	None	None	None
AP-103	2003	None	None	None	None (d)
AZ-102	2003	None	None	Six small areas in the vicinity of the liquid-air interface in Plate #2 (13.2% to 17.8% maximum reduction in thickness)	Three small areas of wall thinning near the Plate #1 vertical weld (10.9% to 16.8% maximum reduction in thickness)
SY-103	2004	None	None	Six small areas in the Plate #1 Vapor Space (10.4% to 12.8% maximum reduction in thickness)	None
SY-101	2004	None	None	Numerous areas in the vicinity of the historical liquid-air interface on Plate #1 (10.4% to 18.4% maximum reduction in thickness)	Numerous areas in Plate #1 and two areas in Plate #2 (10.6% to 17.3% maximum reduction in thickness)
SY-102	2004	None	None	Numerous areas in Plate #1 (10.1% to 12.5% maximum reduction in thickness)	One small area in Plate #1 (10.7% maximum reduction in thickness)

(Cont. on next page)

Tank	Inspection Year (FY)	Reportable Plate Crack Indication	Reportable Plate Pitting	Reportable Plate Thinning	Reportable Weld Thinning, Pitting or Cracking
AP-104	2004	None	None	None	None
AP-106	2005	None	None	None	None
AP-104	2005 ^(e)	Not Investigated	None	None	Not Investigated
AP-102	2005	None	None	Two areas of plate #2 (14% maximum reduction in thickness)	Five areas of thinning in the HAZ of plate #4 (13% maximum reduction in thickness)

Table 11-2. (Cont.) Double-Shell Tanks Chronological Inspection Results Findings

The inspection results in Table 11-2 show that the overall condition of the inspected tanks is satisfactory. Defects or minute reportable localized plate thinning may be due to various reasons, such as fabrication defects, construction damage or in-service corrosion.

Wall thickness data gathered from ultrasonic examination of twenty-six DSTs were compared to evaluate the degree of wall thinning that may have occurred among the tanks examined. These wall thickness data do not allow a direct calculation of wall thinning, since no measurements were made of original plate thicknesses at the time of construction. However, wall thickness data from ultrasonic testing may be compared to the specified nominal plate thickness. This assessment used the minimum wall thickness in each scanning area (generally 12 inches by 15 inches) from the vertical wall scans and then calculated the average for each plate using the minimum thickness values.

Table 11-3 provides a summary of wall thinning, defined as nominal plate thickness minus average minimum plate thickness³, by nominal plate size, and by DST examined. The negative values in the table indicate where the average of all minimum values of plate thickness exceeds nominal plate thickness. The Table also provides the calculated average wall thinning and associated standard deviation by DST examined for all nominal plate thicknesses, and by nominal plate thickness for all DSTs examined.

⁽a) Based on a review of the tank 241-AN-105 data gathering technique in FY 1999, prompted by the FY 2002 results, the FY 1999 wall thinning data is considered questionable.

⁽b) Although below reporting criteria at the time, one linear crack-like indication 6 inch long by 0.142 inch deep in a nominal 0.750 inch thick plate was observed. Subsequent examination of tank 241-AP-108 in FY 2002 revealed no change in size.

⁽c) Primary knuckle examination using T-SAFT conducted in FY 2003.

⁽d) One linear crack-like indication 2.92 inches long in the weld heat-affected zone of a nominal 0.875 inch thick plate was detected. A follow-up inspection determined that the indication is a small area of incomplete fusion that is not open to either surface of the tank.

⁽e) Primary tank upper knuckle examination only.

Average minimum plate thickness is defined as the average of all the minimum measured thicknesses for each scanning area (generally 12 inches by 15 inches) for a given plate size and DST.

Table 11-3. Tank Wall Average Thinning By Nominal Plate Size

DST	FY Examined	Wall Thinning* By Nominal Plate Size (Inches)						
		0.375"	0.500"	0.5625"	0.750"	0.875"	AVG	STD DEV
AN-101	2002	n/a	0.008	n/a	0.027	0.015	0.013	0.014
AN-102	2001	n/a	0.004	n/a	0.003	0.005	0.004	0.016
AN-105	1999	n/a	0.026	n/a	0.007	0.001	0.019	0.032
AN-105	2002	n/a	0.015	n/a	n/exam.	n/exam.	0.015	0.021
AN-106	1999	n/a	0.006	n/a	0.015	0.012	0.009	0.009
AN-107	1998	n/a	-0.018	n/a	-0.015	0.013	-0.016	0.017
AP-101	2003	n/a	-0.008	-0.003	-0.002	0.010	-0.004	0.008
AP-102	2005	n/a	0.029	0.056	0.040	0.065	0.040	0.024
AP-103	2003	n/a	0.008	-0.004	-0.009	0.007	0.000	0.012
AP-104	2004	n/a	-0.006	-0.016	-0.016	0.011	-0.010	0.014
AP-105	2003	n/a	0.004	-0.006	-0.002	0.010	0.000	0.009
AP-106	2005	n/a	-0.007	0.006	-0.012	0.012	-0.004	0.012
AP-107	2000	n/a	-0.011	-0.012	-0.017	-0.013	-0.013	0.008
AP-108	2000	n/a	-0.017	-0.012	-0.011	-0.005	-0.014	0.016
AW-101	2001	n/a	0.008	n/a	0.014	0.020	0.010	0.013
AW-102	2002	n/a	-0.019	n/a	-0.006	0.008	-0.014	0.012
AW-103	1997	n/a	-0.010	n/a	-0.005	0.004	-0.007	0.008
AW-104	2002	n/a	-0.036	n/a	-0.031	-0.007	-0.033	0.011
AW-105	2001	n/a	0.000	n/a	0.008	-0.003	0.002	0.018
AW-106	2002	n/a	-0.004	n/a	0.015	0.000	0.001	0.016
AY-101	2001	-0.011	0.030	n/a	0.018	0.012	0.030	0.029
AY-102	1999	-0.021	0.001	n/a	0.008	n/a	0.000	0.012
AZ-101	1999	0.021	0.027	n/a	0.020	0.003	0.024	0.011
AZ-102	2003	0.017	0.007	n/a	-0.011	-0.004	0.002	0.019
SY-101	2004	0.056	0.009	n/a	0.026	-0.030	0.015	0.020
SY-102	2004	0.042	0.007	n/a	0.009	0.031	0.012	0.014
SY-103	2004	0.041	0.008	n/a	0.019	-0.022	0.012	0.015
	AVG:		0.002	0.001	0.004	0.006		
STD	DEV:	0.028	0.023	0.023	0.020	0.020		i dengan di sa

^{*} Thinning = nominal plate size – minimum thickness n/a – not applicable; n/exam. – not examined

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12.0 FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The findings, conclusions, and recommendations from the UT inspection of DST 241-AP-102 are listed below.

• Reportable wall thinning was detected in plate #2, and in the HAZ of plate #4. Two reportable thinning areas were discovered in plate #2; one at the 23.3 foot tank elevation level, and the other at the 22.6 foot tank elevation level (Att. 2-15). These thinning regions covered a surface area of 0.06 in² and 0.18 in² respectively. The minimum thicknesses reported was 0.430 inches, which represents 86% of the nominal plate thickness.

Reportable thinning was discovered in five areas of the HAZ of the vertical weld of plate #4; three at approximately the 11 foot tank elevation level, and two at approximately the 9 foot tank elevation level (Att. 2-31).

At the 11 foot level, three thinning areas were discovered; one was at the 11.3 foot tank elevation level, and the remaining two were at the 11.1 foot tank elevation level. These three thinning regions covered a surface area of 2.74 in², 4.82 in², and 0.29 in² respectively. The minimum thickness reported was 0.651 inches which represents 87% of the nominal plate thickness.

At the 9 foot level, two thinning areas were discovered; one was at the 9.2 foot tank elevation level, and the other was at the 9.1 foot tank elevation level. These two thinning regions covered a surface area of 0.035 in², and 0.064 in² respectively. The minimum thickness reported was 0.656 inches which represents 87% of the nominal plate thickness.

- The primary wall vertical scans yielded overall average wall thickness values ranging from 98.0% (plate #5) to 100.4% (plate #1). Of the 12 inch long vertical wall plate scans yielding minimums falling below the nominal values, the greatest deviation was 14.0% below the nominal (plate #2, Scan 2), where reportable wall thinning is defined as greater than 10% below the nominal.
- There were neither crack-like indications nor reportable pit-like indications detected in any of the examined areas of tank 241-AP-102.
- The primary tank vertical weld scans (Plates #2 through #5) and the knuckle-to-shell horizontal weld scan (Plate #5 to lower knuckle) yielded overall average wall thickness values that ranged from 97.2% (plate #4 HAZ) to 104.4 % (plate #3 HAZ) of the nominal plate thickness values.
- According to a recent Tank Integrity Assessment Project DST Lifecycle Schedule, tank 241-AP-102 is scheduled for its second, standard UT examination in about nine years. Based on the results of this UT examination, it is recommended that this schedule be maintained – there is no reason to perform any near-term follow-up inspections on this tank.

Following the second UT examination, inspection parameters such as wall thinning rates can be calculated and used to better quantify and evaluate any continual wall thinning or degradation.

• A visual examination of tank 241-AP-102 is scheduled in FY 2009 that will include visually examining the internal primary tank wall.

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ATTACHMENT 1

AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

(COGEMA Engineering Corporation Procedure COGEMA-SVUT-INS-007.3, Rev. 2 Effective: December 16, 2003)

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AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

1.0 PURPOSE

This procedure establishes the method, equipment, and requirements for automated, direct contact, ultrasonic test (UT) straight-beam, thickness measurements, angle beam flaw detection, and sizing, in carbon steel waste storage tanks utilizing the "P-scan" ultrasonic imaging system.

2.0 SCOPE

2.1 Requirements

The requirements herein are applicable to weld inspection, crack detection, sizing, wall thickness measurement, and the detection of wall thinning conditions, such as pitting, erosion, and corrosion in double shell tanks from 0.100 inches to 1.0 inch in thickness. At least one side must be accessible and the component surface to be measured must be parallel with the opposite surface. The requirements are also applicable to the automated UT detection and depth sizing of surface connected planar flaws.

2.2 Scanning

Scanning is performed using remotely controlled automatic scanners.

2.3 Examinations

Examinations shall be performed from inside the annulus of the double shell tanks.

2.4 Instructions

This procedure provides the instructions for the use of Tip Diffraction Techniques including the Absolute Arrival Time Technique (AATT), and the Relative Arrival Time Technique (RATT), for the sizing of planar flaws.

2.5 Methodology

The methodology in this procedure meets the requirements as addressed in Reference 4.1 as applicable to meet the requirements for inspection of double shell tanks.

3.0 RESPONSIBILITIES

Only certified Level II or Level III ultrasonic examiners shall interpret data to determine whether it represents relevant or non-relevant indication in accordance with the applicable specification. Level III ultrasonic examiners shall review all data collected prior to issuing a final report.



AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

4.0 REFERENCES

- 4.1 ASME Boiler & Pressure Vessel Code, Section V, Article 4, 1995 Edition.
- 4.2 COGEMA SV-CP-PRC-014, Qualification and Certification OF NDE Personnel.
- 4.3 COGEMA SVAD-PRC-001, Nondestructive Examination Administrative Procedure.
- 4.4 COGEMA SVUT-PRC-007, *Ultrasonic Examination Procedure*.
- 4.5 FORCE Institutes, P-scan System 4 Instruction Manual

5.0 PERSONNEL REQUIREMENTS

5.1 Personnel Qualifications

Personnel performing or supervising data acquisition or performing data analysis to the requirements of this procedure shall be qualified and certified to at least level II in ultrasonics in accordance with reference 4.2 or equivalent. In addition, they shall be trained in techniques for sizing stress corrosion cracking/planar flaws.

5.2 Certification Level

Personnel performing review for final acceptance of examination data shall be certified to at least level II in ultrasonics in accordance with reference 4.2 or equivalent.

5.3 Support Personnel

Personnel, whose responsibilities are limited to set-up, tear down, and track or scanner operation need not be certified. Such personnel shall possess sufficient knowledge of the equipment to satisfy the Level III examiner.

6.0 EQUIPMENT

6.1 Ultrasonic Instrument/Examination System

The P-scan computerized pulse-echo ultrasonic inspection system shall be used. The system shall be equipped with a stepped gain control in units of 1dB with a dynamic range of at least 115 dB, capable of generating and receiving frequencies in the range of 0.5 to 15 MHz. The following components may be used:



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PS-4	P-scan processor			
Analysis computer	Off-line data analysis with P-scan analysis software			
Digital Controller, WSC-2S, or other approved scan controller	Automatic scanner controller			
AWS-5, AWS5-D, RUTI*	Automatic P-scan scanner			
Pump	Couplant pump for P-scan system			

^{*}Remote Ultrasonic Test Instrument (RUTI) system

6.2 Transducers

Straight-beam and angle-beam transducers with single or dual elements, with or without delay tips, may be used, provided they can be attached to and manipulated by the scanner, and can be adequately coupled to the test item with a resultant backwall signal response of at least a 2 to 1 signal-to-noise ratio. Sizes and frequencies shall be as specified for the following applications:

- 6.2.1 For high sensitivity applications such as the detection of pitting, erosion or corrosion, transducer sizes in the range of 1/4 inch to 1/2 inch, with a frequency in the range of 4.0 to 10 MHz, shall be used.
- 6.2.2 For weld inspection, detection and sizing of planar flaws that are open to the surface, angle beam transducers with a nominal angle of 45°, with an element size in the range of 1/4 inch to 1/2 inch, and with a frequency in the range of 4.0 to 10 MHz, shall be used. Where interference from weld geometry prevents examination of the required volume with a 45° transducer, a 60° angle may be substituted.
- 6.2.3 Transducers of other angles, element sizes, modes of propagation, or frequencies outside the above ranges may be used to suit other required examination techniques.

6.3 Cables

- 6.3.1 Cables of any compatible type and number of connectors may be used for examination. The length shall be limited to 400 feet, or less where signal degradation occurs. The same cables shall be used for calibration and examination.
- 6.3.2 The scanner control cable for analog scanners shall be limited to 330 feet maximum. Digitally controlled scanners shall have a maximum cable length as stipulated by the manufacture's recommendation.



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6.4 Couplant

- 6.4.1 Site approved water should be used as couplant for the examination.
- 6.4.2 Couplant application should be accomplished by means of an automatic couplant delivery system whenever possible. Care should be taken to use only as much water as required, as excess water in the annulus is undesirable.

6.5 User Calibration Blocks

- 6.5.1 For general thickness measurements, or the detection of pitting, erosion, or corrosion, user calibration blocks shall be made of an acoustically similar material as that being measured. A standard step block with 0.1 inch or greater increments encompassing the nominal thickness to be measured shall be used.
- 6.5.2 For weld inspection, crack detection and sizing measurements, user calibration blocks shall be made of an acoustically similar material as that being measured. A standard notched block with 0.1 inch or greater increments encompassing the nominal thickness to be measured shall be used.

6.6 Reference Blocks

Reference blocks (e.g., Rompas, IIW, DSC) utilized for beam angle exit point determination or screen width calibration shall be of similar material composition as the component under examination.

6.7 Pulse Repetition Rate

The repetition rates are set at rates such that signal wrap-around does not occur. In addition, the rates are sufficient to pulse the transducer at least six times within the time necessary to move one-half the transducer dimension parallel to the scan direction at maximum scanning speed.



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7.0 CALIBRATION

7.1 Verification of Instrument Linearity

Instrument alignment verification for screen height and amplitude control should be performed within three (3) months prior to use of the instrument or at the beginning and end of each outage period, whichever is less. Instrument linearity verification is independent of transducer or scanner characteristics. Verification with one transducer/scanner combination is valid for any other combination. The due date for alignment verification shall be recorded on the calibration sheet.

7.2 System Parameters

The system parameters used for calibration and examination should be established as outlined in Reference 4.5 as required. The system should be operated in the T-SCAN program for thickness mapping and zero degree inspection and in the P-SCAN program for crack detection, weld inspection and/or additional evaluation.

7.3 General Requirements

- 7.3.1 Calibration shall include the <u>complete ultrasonic examination system</u>. Any change in transducers, wedges, couplants, cables, instruments, recording devices, scanners, power source, personnel, or any other parts of the examination system shall be cause for system calibration check.
- 7.3.2 If a secondary ultrasonic system is to be used, it must be calibrated before the inspection is started and not removed from the examination system during the inspection or recalibration will be required.
- 7.3.3 System calibration checks and final calibration for instrument sensitivity and sweep range shall be performed on the same block used for initial calibration using at least one reflector. These checks shall be performed:
 - a) At the start and finish of each series of examinations.
 - b) At intervals not to exceed 16 hours.
 - c) When there is a change as described in 7.3.1.
 - d) If the examiner suspects a malfunction.
- 7.3.4 If the horizontal sweep, thickness, or "Z" positions have changed more than 5% of the nominal thickness, void all examinations performed after the last valid calibration verification, and reexamine the voided areas.
- 7.3.5 <u>Calibration checks</u> may be performed on either a reference block or the basic calibration block, but must include a check of the entire examination



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system. Calibration checks may be accomplished by static or dynamic calibration.

- 7.3.6 Simulated calibration checks may be used in lieu of calibration checks where the spread of contamination or serious time constraints would result from performing a standard calibration check. Simulated calibration will use blocks, cables, or transducers of similar types and lengths as those used for testing and will be documented on the calibration data sheet. A baseline, simulated calibration shall be performed immediately after performing the initial calibration, or after a calibration check where the entire examination system is utilized. The initial simulated calibration check values are independent of the values obtained utilizing the entire examination system. The established tolerance applies to the subsequent simulated calibration checks.
- 7.3.7 During calibration, the temperature of the calibration block should be within 25 degrees Fahrenheit of the ambient inspection temperature.
- 7.4 Calibration Process for Thickness Mapping / T-scan

The basic process for calibration is the same for thickness mapping (T-scan), weld inspection, flaw detection, and sizing. The calibration reflectors for straight beam are the backwall reflections from a step wedge. The reflectors for angle beam transducers are the notch base and tips from a notched block. The calibration process is as follows:

- 7.4.1 Select and connect the appropriate transducer(s), input the parameters, including thickness, frequency, index delay, gates, inspection method(s), and velocity. Apply the couplant to the applicable points on the calibration standard. (Select a sufficiently thin step for detection of unexpected low reading or pits and a step greater than the maximum thickness expected.)
- 7.4.2 Place the transducer(s) on the 1.00" calibration step and adjust the gain control to produce a reflection of 80% full screen height (FSH). Input this gain level as the reference level. Obtain a response from the 0.300" calibration step, and verify that it produces an acceptable signal. Other thickness ranges may be used for system calibration. Initial calibration accuracy will be within +/- 0.010" in T-scan. Record reading on the Automated Ultrasonic Thickness Calibration Sheet (Attachment 1).
- 7.4.3 The vital parameters used for the calibration shall be identical to the inspection parameters with the exceptions of file name(s), X, Y and Z ranges, reference level compensations, thickness, gates or comment parameters which may be adjusted as required.



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- 7.5 Calibration Process for Weld Inspection / Crack Detection / P-scan
 - 7.5.1 Select and connect the appropriate transducer(s), input the parameters, including thickness, frequency, index delay, gates, inspection method(s), and velocity. Apply the couplant to the applicable points on the calibration standard. The 5%T notch on a 1" thick plate should be used to obtain the reference level.
 - 7.5.2 Manipulate the transducer to receive the maximum response from the reference notch. Adjust the gain control to produce a reflection of 80% full screen height (FSH). Input this value as the reference level. Obtain a response from the calibration reflector and verify that the response is within +/- 2dB.
 - 7.5.3 Repeat step 7.5.2 as required for each transducer until the system is calibrated.
 - 7.5.4 The vital parameters used for the calibration shall be identical to the inspection parameters with the exceptions of file name(s), X, Y and Z ranges, reference level compensations, thickness, gates or comment parameters which may be adjusted as required.
- 7.6 Sizing Calibration for Tip Diffraction Techniques (AATT, RATT)
 - a) Select an appropriate transducer.
 - b) Select a sizing calibration block of similar thickness and material containing at least two notches of known depths.
 - c) For the AATT technique, set at least two gates, to cover the entire area of interest. The first gate in the first leg, ending just before the ID. Position the transducer on the calibration block. Alternately peak the shallow and deep signals from the notch tips (see Figure 1, Attachment 2). Using the index delay and velocity controls, adjust the system until the system correctly reads the remaining ligament with the "Z" cursor.
 - d) For the RATT technique, the system mode should be set to A-SCAN. Manipulate the transducer until signals are obtained from the shallow notch tip and the notch base simultaneously (see Figure 2, Attachment 2). Using the index delay and velocity, adjust the distance between the two signals to read the actual reflector depth in inches. Repeat the same process on the deep notch. Alternate this procedure until the screen/system represents a desirable linear depth screen in inches.



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e) Save the calibration, and record this data on the Automated Ultrasonic P-Scan Calibration Sheet (Attachment 3).

8.0 EXAMINATION

8.1 Surface Condition

- 8.1.1 The surface from which measurements are to be taken should be free of loose scale, unbonded coating, heavy oxidation, weld spatter, or other material which may interfere with movement of the transducer or the transmission of sound into the material.
- 8.1.2 A surface finish of 250 RMS or better should be provided. The requesting organization must approve the use of any base material preparation process, which may reduce the thickness below the allowable tolerance.

8.2 Extent of Examination

The location of the areas to be measured and/or the number of scans to be performed shall be designated by the applicable work instructions. The location, scan numbers, and reference points of all scans shall be recorded on the applicable data sheets. See Attachment 4 for minimum examination volume and beam direction for weld inspection.

NOTE: Additional scan areas will not require revision to this procedure.

8.3 Flaw Location

When performing examinations to detect planar flaws, angle beam transducers shall be used. Calibration is performed as in Section 7.5. All angle beam examinations shall be performed in P-scan.

8.4 Ultrasonic Measurement

User calibration shall have been completed per the applicable requirements of Section 7.0 prior to performing any of the examinations.

- 8.4.1 Transducer overlap between passes shall be a minimum of <u>50%</u> of the element size. Scanning speed shall not exceed <u>6 inches</u> per second.
- 8.4.2 Should measurements be observed larger or smaller than the calibration range, check the calibration for accuracy in the encountered thickness range. If the calibration is accurate in this range, amend the calibration sheet and continue the examination. If the calibration is not within the



AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

tolerance allowed in the spec, then <u>recalibrate and rescan</u> all areas where readings were encountered outside the originally calibrated range.

8.5 Limitations and Precautions

- 8.5.1 Care must be taken to ensure the transducer face is flush with the examination surface during scanning.
- 8.5.2 When it is necessary to determine the origin of mid-wall indications, a 4MHz shear wave transducer(s) may be used in the P-Scan program to detect pit openings or perpendicular connections between laminar indications.

8.6 Recording

Upon completion of each scan area, the data file(s) shall be recorded on a disk. All measurements within the predetermined gated area are stored, along with the text information with each file.

8.7 General Sizing Guidelines

- 8.7.1 It is recognized that, of the methods of sizing described in this procedure, no one technique is completely accurate in sizing all flaws in all thicknesses. By using complementary methods, however, a realistic approximation of the flaw depth can be obtained.
- 8.7.2 The method of sizing pits is primarily utilizing a 0° dual element transducer. The 45° shear wave transducers may be used to confirm qualitatively the depth of the pit.
- 8.7.3 When sizing crack-like indications, the entire flawed area shall be scanned with the imaging mode. The entire flaw length shall be evaluated. It is recommended that A-Scans be recorded at the <u>deepest</u> location of the flaw. The primary technique for sizing crack-like indications is the high frequency, 45° shear wave transducer utilizing the Absolute Arrival Time Technique (AATT). The dual element, straight beam may be used as a complimentary technique.
- 8.7.4 Additional sizing technique sequences may be utilized if the primary techniques identified prove to be indeterminable.



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- 8.8 Sizing with Tip Diffraction Techniques (AATT, RATT)
 - 8.8.1 The AATT technique uses shear waves to obtain a diffracted echo (satellite pulse) from the flaw tip (see Figure 1, Attachment 2). The RATT technique uses shear wave reflected signals from both the flaw tip and the flaw base (see Figure 2, Attachment 2). Both techniques can be utilized using the same transducer.

a) AATT Technique

Locate the deepest extremity of the flaw and maximize the signal from the flaw tip. The distance to the flaw tip represents the remaining material ligament from the outside surface. To determine the relative through wall flaw depth, subtract this dimension from the local material wall thickness.

b) RATT Technique

Locate the deepest extremity of the flaw, and obtain a signal from the flaw base. Manipulate the transducer until the doublet (flaw base and tip signal appearing simultaneously) is observed. These signals do not have to be peaked, as the doublet separation directly indicates the relative through wall depth. To determine remaining material ligament, subtract the relative through wall depth measurement from the local material wall thickness.

8.8.2 Other sizing techniques or variations to the techniques may be used with the approval of the UT Level III. Such approval, signature and a description of the technique shall be recorded in the "Remarks" column on the Automated Ultrasonic P-Scan Calibration Sheet (Attachment 3).

9.0 EVALUATION

9.1 Relevant Indications

Relevant Indications, including pitting, thinning and crack-like indications, along with the minimum thickness reading in the area of interest, shall be recorded and used for evaluation per Paragraph 9.2.

9.1.1 P-scan data shall be evaluated to a sensitivity of 20% reference level (-14dB). All crack-like indications are recordable regardless of amplitude.



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- 9.1.2 T-scan data shall be evaluated utilizing all available images to detect and evaluate indications.
- 9.1.3 Reportable indications shall be evaluated by Level III personnel prior to final report submittal.

9.2 Reporting/Special Criteria

Reporting and special notification criteria are noted in Section 9.8.

9.3 Statistical Information

The statistical information (Minimum and Mean thickness) provided under "Setup" pages 1 & 2 of the post-processing software should be reported for each "Part" of a given scan location. Where data noise invalidates these values, the analyst should determine the values using the level control.

9.4 Printouts

Printouts should be made in accordance with the customer's request. In absence of further direction, both the merged set-up pages and the merged image, adjusted to show the minimum thickness, shall be printed at a level that best shows the wear patterns or at Nominal T - 10.0%, whichever provides the most useful information. P-scan data should be printed with the level control set at 20% reference level (-14dB).

9.5 Recording Crack Size

- 9.5.1 All flaw sizing data acquired should be used to determine the flaw depth.

 This data shall be reported individually for each flaw and shall include all data necessary to achieve the best accuracy of flaw depth.
- 9.5.2 If, during sizing, a <u>flaw length other than that reported during the detection examination</u> is measured, or other discrepant conditions occur, record the corrected lengths, locations. or distances on the Automated Ultrasonic P-scan Data Report (Attachment 5) in the spaces provided.
- 9.5.3 If, during sizing, the area is determined <u>not to be flawed</u>, and the resultant reflector(s) is due to component/weld geometry or metallurgical structure, the true origin (e.g., root, mismatch, etc.) shall be documented and substantiated on the Ultrasonic P-scan Data Report.



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9.6 Scanning Limitations

Record all limitations due to weld configurations, obstructions, single side access restrictions, etc., in the remarks section on the applicable Ultrasonic Data Report. Details as to specific length or area in relation to L (X) and/or W (Y) reference points should be recorded.

9.7 Flaw Evaluation

Reportable indications shall be evaluated by Level III personnel prior to final report submittal.

9.8 Reporting Levels

All indications which meet or exceed the following conditions shall be reported to the project cognizant engineer.

- a) Pit depth exceeds 25% of the wall thickness.
- b) Wall thinning exceeds 10% of the wall thickness.
- c) Surface crack depths exceeding 0.100 inches.



AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

10.0 REPORTS

10.1 Thickness Data Reports

An Automated Ultrasonic Thickness Data Report (Attachment 6) shall be prepared for each examination or series of examinations performed. This report shall include identity of equipment, the thickness measurements obtained, and should be referenced to the calibration sheet.

10.2 Calibration Reports

An Automated Ultrasonic Thickness Calibration Sheet (Attachment 1), and an Automated Ultrasonic P-Scan Calibration Sheet (Attachment 3) shall be prepared for each examination or series of examinations performed. These reports shall include the materials and equipment used for examination.

10.3 Sketch Sheets

Automated Ultrasonic Examination Sketch Sheet(s) (Attachments 7 and/or 8) should be prepared for each examination or series of examinations performed. These reports should include a sketch of the component or item examined, identifying scan locations, including dimensions, reference points, and grid locations, where applicable.

10.4 Sizing Data Reports

An Automated Ultrasonic P-Scan Data Report (Attachment 5) shall be completed only when cracking is detected. Each report shall be related to the applicable Automated Ultrasonic Examination Calibration Sheet(s).

10.5 Final Reports

Final reports are to be distributed and maintained in accordance with the applicable contract.



AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

11.0 ATTACHMENTS

Attachment 1:	Sample Automated	Ultrasonic	Thickness	Calibration	Sheet

Attachment 2: Figure 1: Absolute Arrival Time Technique (AATT)
Figure 2: Relative Arrival Time Technique (RATT)

Attachment 3: Sample Automated Ultrasonic P-scan Calibration Sheet

Attachment 4: Examination Volume, Minimum Beam Directions and Extent of Examination

Attachment 5: Sample Automated Ultrasonic P-scan Data Report

Attachment 6: Sample Automated Ultrasonic Thickness Data Report

Attachment 7: Automated Ultrasonic Examination Sketch Sheet – Tank Walls and Knuckles

Attachment 8: Automated Ultrasonic Examination Sketch Sheet - Tank Bottom



AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

Attachment 1: Sample Automated Ultrasonic Thickness Calibration Sheet

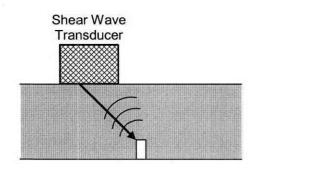
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Attachment 2: Absolute Arrival Time Technique (AATT) & Relative Arrival Time Technique (RATT)



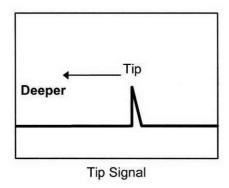
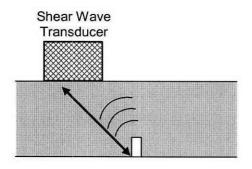
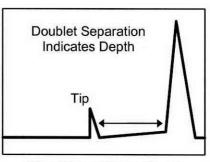


Figure 1. Absolute Arrival Time Technique





Flaw Tip and Base Signal

Figure 2. Relative Arrival Time Technique



AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

Attachment 3: Sample Automated Ultrasonic P-scan Calibration Sheet

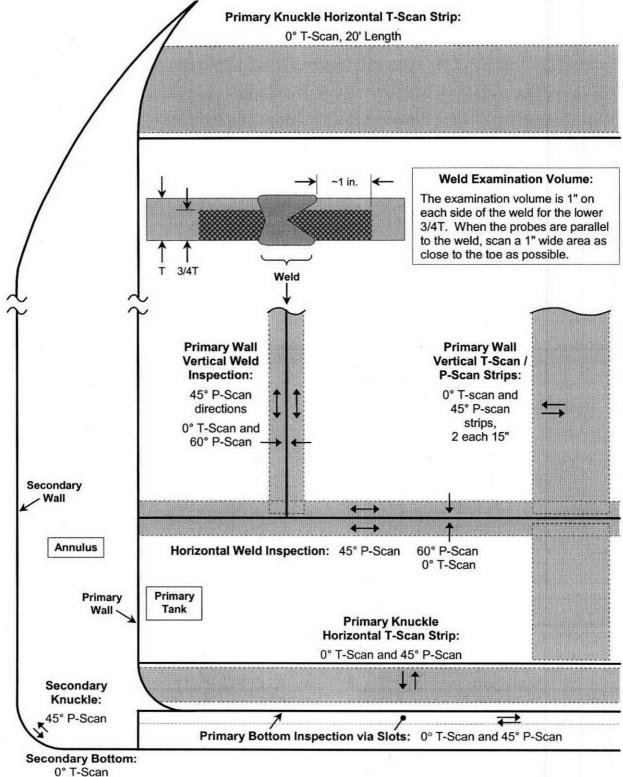
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Rev. Dec. 03, 2003



AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

Attachment 4: Examination Volume, Minimum Beam Directions and Extent of Examination Primary Knuckle Horizontal T-Scan Strip:





AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

Attachment 4 (continued): Extent of Examination

Primary Tank Wall

<u>Vertical Strips</u> - Examine a vertical strip 30" x 35 feet long of the primary wall between the upper haunch transition and the lower knuckle for pits, cracks and wall thinning. Axial cracks on the tank inner wall surface shall be detected and sized. The vertical strip may be comprised of one or more strips whose total width is equal to 30 inches.

Weld Areas - Examine 20 feet of horizontal weld area (heat affected zone), at tank to knuckle weld. Examine one ~10 foot section of vertical weld joining the lowest shell course plates and one ~10 foot section of vertical weld joining the next to lowest shell course plates. Axial and circumferential cracks on the tank inner surface shall be detected and sized.

Primary Tank Knuckles

Examine 20 feet of the primary tank lower knuckle in the circumferential direction to detect and size cracking in the circumferential direction and to detect pits and wall thinning. Examine 20 feet of the primary tank upper knuckle in the circumferential direction to detect pits and wall thinning. The areas to be examined are from the welds joining the transition plates with the knuckles to the furthest reach of the transducer assembly that is allowed by geometric constraints.

Secondary Tank

<u>Secondary Tank Lower Knuckle</u> – Examine a 20 foot length of the secondary tank knuckle over the entire area of the knuckle for the presence of circumferential cracks.

<u>Secondary Tank Bottom</u> – Examine the secondary tank bottom over an area of 10 ft² to detect and measure thickness and pits.

Primary Tank Bottom

Examine the primary tank bottom for pits, wall thinning and cracks oriented in the circumferential direction (perpendicular to the air channels) in 16 air channels. The tank bottom is to be examined for a distance of 12 feet towards the tank center, starting seven inches inboard of the outside radius of the tank cylindrical section. The primary tank bottom scan head is designed to examine the accessible area in the air channel in one pass through the channel.



AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

Attachment 5: Sample Automated Ultrasonic P-scan Data Report

	AUT	OMATED	ULTRAS	ONIC P-S		Juas	Job #	un Data	Rise	r#
Loc	ation:			System:		Exa	m Start:		Exan	n End:
Con	ponent ID:					Exa	mination Sur	face:	Nom	inal kness:
Con	figuration:	· 	ТО				brated	TO		Temp: °F
Tota	l Length Exa	mined:		Scan Width	h:		Level Corre	ction (Trai	ns. Corr):	DB
Pro	cedure:			<u> </u>	Rev.		erial Type: SS 🔲 CS	OTHER:		Condition:
File / Ite	Name m #:		·			Tran	nsducer:		0 DEG [o □ ANGLE:
	Ref. Point (Lo)):								
Y _o f	Ref. Point (Wo):								
	Sizing Meth	od	Angle (deg)	Refere	ence Cal. Sh	eet		Set-U	Jp / File Na	ame
1	45° SHEAR						 			
2	60° SHEAR				trade de la constantina della					
3	AATT									
4	DUAL 0°								•	
				INDICA	TION INFO	RMAT	ION			
Ind.	Method	Weld		ax. L1	Length	L2	W1	Width	W2	Indication Type
		Side	R. Lig. An	np. (in)	(in)	(in)	(in)	(in)	(in)	mulcation type
		<u></u>								
			• • • • • • • • • • • • • • • • • • • •		1			 		
		-								
			- -		-		-			
Rer	narks:									
Exa	miner:		Examiner:		An	alyst:		1 1	Reviewer:	
					'3"	,,] '	. TO THO WOLL	
Leve	el:		Date: Level: Level:							-

Rev. Dec. 03, 2003



AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

Attachment 6: Sample Automated Ultrasonic Thickness Data Report

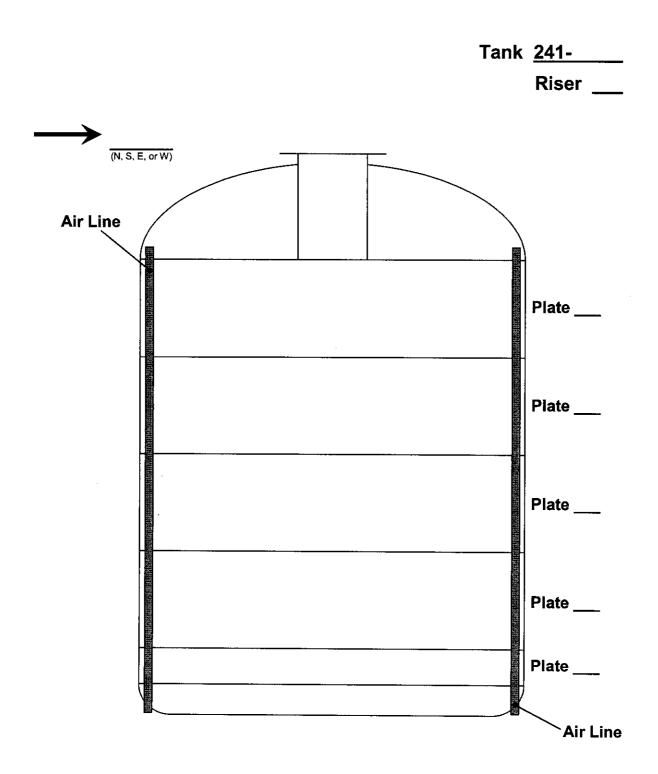
	ATED UL		NIC THICK			Job#			Riser#		
Location:	יאל	ARLIG	'IN I		Exa	am Start:			Exam 6	≣nd:	·
Component ID:						amination Surfa		D	Nomina Thickne		
Configuration:		ТО	,		Ca	librated nge:	то	•		emp:	°F
Total Length Exam	ined:		Scan Width:		Re	f. Level Correct	ion (Trar	ıs. Çol	r.):		DB
Procedure:				Rev	Ma	iterial Type:]SS □ CS 0	THER:			Cond	ition:
File Name:				I	Tra	ansducer:	•	0 DEG	П/	ANGLE	. 0
Xo Ref. Point (Lo):							-				·
Yo Ref. Point (Wo):											
Part # / Indication	X Start (in)	X Stop (in)	Y Start (in)		Stop in)	Ave. Thk. (in)	Min. T R. Lig.		Are Report		Max. Thk. (in)
	***************************************										FTREE-U
						77-21:3-21-1					
			_							-	
											-
D											
Remarks:											
Examiner:		Examiner:		Α	nalyst:			Revie	wer:		
Level:		Da	ite:	_ _ Le	evel:		PArtic	Level	:		

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AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

Attachment 7: Automated Ultrasonic Examination Sketch Sheet - Tank Walls and Knuckles





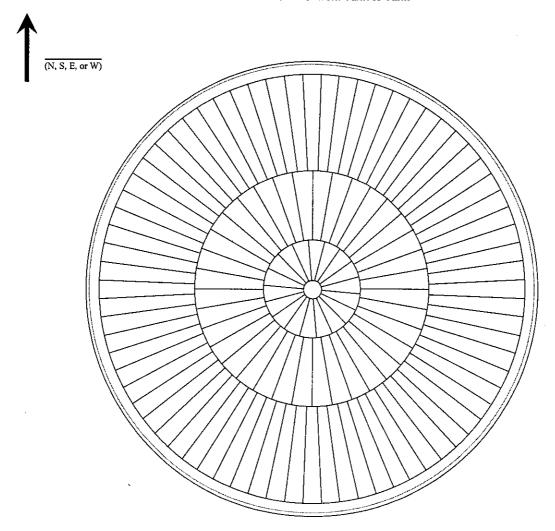
AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

Attachment 8: Automated Ultrasonic Examination Sketch Sheet - Tank Bottom

Tank <u>241-</u>

Typical Air Channels Under Tank Bottom

Note: Flow Path Geometry and Number of Channels Differ from Tank to Tank



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ATTACHMENT 2

COGEMA "AUTOMATED ULTRASONIC THICKNESS DATA REPORT SHEETS"

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AUTOMA	ATED ULT	RASONIC REPOR		NESS	Job # 04-41			Riser#			
Location: 200 EA	ST TANK F	ARM			Ex	am Start: 02/10/05	1238	Exam End:	2000		
Component ID:	102-AP				Examination Surface: Nominal Thickness: .500"						
Configuration:	PLAT	E TO			Calibrated Range: 0.3" TO 1.0" Temp: AMB OF						
Total Length Exami	ned: 90.4	6" S	can Width:	17"	Re	f. Level Correct	ion (Trans. Co	orr.):	0 DB		
Procedure:	SEMA SVU	T-INS-007.	3	Rev 2		aterial Type: ☐ SS 図 CS O	THER:		lition: N/A		
File Name:	VERT	WALL / PL	ATE 1			ansducer: ☑ DUAL ☐ So	GL 🖾 0 DE	G □ ANGLE	. 0		
Xo Ref. Point (Lo):	1" below h				1 8	S DONE	2,000	<u> </u>			
Yo Ref. Point (Wo):		of 24" rise	r								
Part # / Indication	X Start (in)	X Stop (in)	Y Start	t YS		Ave. Thk.	Min. Thk., R. Lig. (in)	Area Reportable	Max. Thk. (in)		
012						.505"	.465"		.515"		
-1224						.505"	.478"		.515"		
-2436						.510"	.506"		.515"		
-3648						.510"	.506"		.515"		
-4860						.510"	.506"		.515"		
-6072						.510"	.505"		.515"		
-7284						.510"	.465"		.515"		
-8490.46						.505"	.453"		.510*		
Remarks:											
[N1] See Atta	sched Letter	r From J. B	. Elder								
Examiner: W. H.	Nelson	Examiner:		4	U	W. H. Nelson	w				
Level: III Date: _): 	_ Le	evel: _	III Date: <u>02/2</u>	8/05 Lev	vel: III Date:	ev. Dec. 03, 200		

Att. 2-3

COGEMA-SVUT-INS-007.3, Rev. 2, Attachment 6

ATTACHMENT 2

COGEMA "AUTOMATED ULTRASONIC THICKNESS DATA REPORT SHEETS"

AUTOMATE D	D ULTRAS		CAN	Jo	ь# С	4-41	Riser #			
Location: 200 EAST TAI	NK FARM	System:	PSP-4	Exam S	tart: 2/10/05	1238	Exam E	ind: 2001		
Component ID: 102-AF	,			Examin	ation Surf		Nomina	1		
Configuration:	PLATE TO			Calibra Range:	ted)" то 1.414	Te	mp: AME	°F	
Total Length Examined:	90.5"	Scan Width:	17"	Ref. Le	vel Correc	tion (Trans.	Corr):	<u>0</u> DE	3	
Procedure: COGEMA 5	SVUT-INS-00	07.3	Rev. 2		I Type: ⊠ CS (OTHER:		Condition: N/A		
File Name	ERT WALL /			Transd	ucer:		= L		5°	
Xo Ref. Point (Lo):	low horiz wel			1 00	AL DI	,		WOLL. 1	2	
Yo Ref. Point (Wo):	er line of 24" r									
Sizing Method	Angle (deg)		nce Cal. S	heet		Set-Up	/ File Nam	e		
1 45° SHEAR										
2 60° SHEAR										
3 AATT										
4 DUAL 0°										
. I Weld	Depth M	ax. L1	Length	ORMATIC L2	N W1	Width	W2			
nd. Method Side		np. (in)	(in)	(in)	(in)	(in)	(in)	Indication 7	Гуре	
		+		-		\vdash				
			+ -	-	-					
			+							
Remarks:	1			1	l	1			-	
No crack like indica										
[N1] See Attached				Nach of 141	U Mata		audau ar	I D Elder		
Examiner: W. H. Nelson W. Deba	Examine			Analyst: W	- 1		eviewer: .	J. B. Elder		
Level: III Date: 02/10/0	5	Date:		_evel: <u> </u>			evel: <u>III</u> (Date:	_	
COGFMA-SVUT-INS-007.3. Rev.	Attachment 5							Rev. Dec.	03. 20	

AUTOMA		RASONICA REPORT		NESS		Job # 04	1-41	Rise	30	
Location: 200 EA	ST TANK	FARM			Exa	am Start: 02/01/05	0817	Exa	m End:	1506
Component ID:	102-AP				Ex	amination Surfa	ce:	THE STATE OF THE S	ninal	.500"
Configuration:	PLA [*]	re ^{to}								AMB ^o F
Total Length Exami	ned: 86.6	" s	ican Width:	15"		f. Level Correct	ion (Trans. C	Corr.):		0 DB
Procedure:		T-INS-007.	3	Rev 2		aterial Type:	THER:	4	Cond	
File Name:	VERT	WALL / PI	ATF 2		Tra	ansducer: ☑ DUAL ☐ SO			☐ ANGLE	0
Xo Ref. Point (Lo):	1" below h					A DOAL US	SL MODE	-0	M ANGLE	
Yo Ref. Point (Wo):		e of 24" ris	er							
Part # / Indication	X Start (in)	X Stop	Y Star		top	Ave. Thk.	Min. Thk. R. Lig. (in	ATTEMPT BEINGER TO	Area portable	Max. Thk.
0-12						.490*	.476*			.505"
12-24						.495"	.483*			.505"
24-36						.495*	483"			.505*
36-48						.495"	.490"			.505"
48-60						.495"	.482"			.505*
60-72						.495*	.478"			.505*
72-84						.495"	.478"			.505*
84-86.6						.490"	.482"			.500"
								t		
								+		
Remarks:										
[N1] See Atta	Nelson	er From J. E Examiner:	3. Elder	THE RESERVE	nalys	t: W. H. Nelson			er: J. B. I	Elder
Level: III Date:		Dai	te:			III Date: <u>03/0</u>		N1] evel: <u>l</u>	II Date:	
COGEMA-SVUT-INS-00	7.3. Rev. 2. Altac	nment 6	201911						R	ev. Dec. 03, 20

AUTOMATED ULTRA DATA REP		CAN	Jo	ob# C	4-41	Rise	er# 30
ocation:	System:		Exam 5			Exa	m End:
200 EAST TANK FARM		PSP-4		2/01/05			1501
omponent ID: 102-AP			Ø OD	the state of the s	ace:		ninal ckness: 0.5000"
configuration: TO PLATE			Calibra Range	: (то 1.41	THE CONTRACTOR	Temp: AMB ^O F
otal Length Examined: 86.6"	Scan Width	15"			tion (Trans	. Corr):	<u>0</u> DB
rocedure: COGEMA SVUT-INS-	007.3	Rev. 2	ss	al Type: ⊠ CS (OTHER:		Condition: N/A
ile Name Item #: VERT WALL	/ PLATE2		Transc		SGL 0	DEG	⊠ ANGLE: 45°
6 Ref. Point (Lo): 1" below horiz w	reld						
o Ref. Point (Wo): center line of 24	" riser						
Sizing Method Angle (deg) Refere	ence Cal. She	eet		Set-Up	/ File N	lame
1 45° SHEAR							
2 60° SHEAR			-				
3 AATT							
4 DUAL 0°	INDICA	TION INFO	RMATIC	ON			
	epth Max. L1 Length			W1	Width	W2	Indication Type
Side R. Lig.	Amp. (in)	(in)	(in)	(in)	(in)	(in)	maicauon rype
				1	1		
		-		-	-		
							4
Remarks:							
No crack like indications							
[N1] See Attached Letter From	the state of the s		aluat 147	U Nalaa		Povious	er: J. B. Elder
Examiner: W. H. Nelson Examin	ner:		w L	H. Nelson		(N1)	a. J. B. Cider
Level: III Date: 02/01/05	Date:			Date: 03/			II Date:
							Rev. Dec. 03, 200

AUTOMA		RASONIC REPORT		NESS		Job#	1-41	Riser #	
Location: 200 EA	ST TANK I	FARM			Ex	am Start: 11/30/04	0941	Exam End:	2040
Component ID: 1	02-AP				Ex	amination Surface	ce:	Nominal Thickness:	.5625"
Configuration:	PLAT	TE TO				Thretad	.3" то 1.0"		AMB °F
Total Length Exami	ned: 89.4	, So	an Width:	15"		f. Level Correct		огт.):	DB
Procedure: COG		T-INS-007.3	3	Rev 2		aterial Type:	THER:	Cond	THE RESERVE OF THE PARTY OF THE
File Name:	VERT	.WALUPLA	TF 3		Tr	ansducer:		G ANGLE	0
Xo Ref. Point (Lo):		noriz. weld				A DUAL LIST	sc Mone	3 LIANGLE	
Yo Ref. Point (Wo):	center line	of 24" rise							
Part # / Indication	X Start (in)	X Stop (in)	Y Star	t YS		Ave. Thk.	Min. Thk., R. Lig. (in)	Area Reportable	Max. Thk. (in)
0-12						.558"	.489*	PIT	.565"
12-24						.560"	.507*		.565*
24-36						.560"	.503*	PIT	.570*
36-48						.565*	.513"	lupn	.570*
48-60						.565*	.514"	1000	.570"
60-72						.565*	.506"	PIT	.570"
72-84						.565*	.513"		.570*
84-89.4						.560"	.491*	PIT	.565*
								-	
						ļ —			
								+	
Remarks: [N1] See Atta	ached Lette	er From 1 B	Fider						
Examiner: W.O.		Examiner:	. Lidei	_ 6	unaly:	st W. H. Nelson		eviewer: J. B.	Elder
Level: II Date:		Date	e:	_	.evel:	<u> </u> Date: <u>02/</u>	23/05 L	evel: <u>III</u> Date	
P-Scan Limited		hment 6						,	Rev. Dec. C

200 EAST TANK FARM PSP-4	
Component ID:	Exam Start: Exam End: 2047
Component ID: 102-AP	Examination Surface: Nominal Thickness: 0.5625"
Configuration: PLATE	Calibrated Range: 0" To 1.59" Temp: AMB OF
Total Length Examined: 89.3" Scan Width: 15"	Ref. Level Correction (Trans. Corr): 0 DB
Procedure: COGEMA SVUT-INS-007.3 Rev. 2	Material Type: Condition: ☐ SS ☑ CS OTHER: N/A
File Name / Item #: VERT.WALL/PLATE 3	Transducer: ☐ DUAL ☑ SGL ☐ 0 DEG ☑ ANGLE: 45°
Xo Ref. Point (Lo): 1" below horiz. weld	
Yo Ref. Point (Wo): center line of 24" riser	
Sizing Method Angle (deg) Reference Cal. Shee	Set-Up / File Name
1 45° SHEAR	
2 60° SHEAR	
3 AATT 4 DUAL 0°	
4 DUAL 0° INDICATION INFOR	MATION
Mold Depth May 11 Length	12 MA Midth M2
nd. Method Side R. Lig. Amp. (in) (in)	(in) (in) (in) Indication Type
Remarks:	

COGEMA-SVUT-INS-007.3, Rev. 2, Attachment 5

Rev. Dec. 03, 2003

Location: Component ID: 102-AP	AUTOMA	AUTOMATED ULTRASONIC THICKNESS DATA REPORT						4-41	Riser # 30		
Configuration: PLATE Total Length Examined: 104.7" Scan Width: 15" Ref. Level Correction (Trans. Corr.): O DB		ST TANK	FARM			Exa		0820	Exam End:	1454	
Configuration: PLATE Total Length Examined: 104.7" Scan Width: 15" Ref. Level Correction (Trans. Corr.): 0 DB	Component ID:	102-AP									
Total Length Examined: 104.7"	Configuration:	PLA"	TE TO			Ca	librated			AMB °F	
Procedure: COGEMA SVUT-INS-007.3 Rev 2 SS SO SO THE: Condition: N/A	Total Length Exami	ned: 104.	7" So	an Width:	15"			on (Trans. Co	от.):	n DB	
Vert.Wall/Plate 4 Dual SGL Does Angle:	Procedure: COC			3	Rev 2			THER:	Cond	lition:	
Xo Ref. Point (Lo): 1" below horiz. weld Yo Ref. Point (Wo): center line of 24" riser Part # / Indication O-12 Part # / Indication O-12 O-12 O-12 O-12 O-12 O-13 O-14 O-15 O-15 O-16 O-17 O-18 O-19 O-19	File Name:	VER	r.WALL/PLA	TE 4		Tra	ansducer:		C TANGE	0	
Yo Ref. Point (Wo): center line of 24" riser Part # / Indication X Start (in) X Stop (in) Y Start (in) Y Stop (in) Ave. Thk. (in) Min. Thk., (in) Area Reportable (in) 0-12	Xo Ref. Point (Lo):					1	S DONE	SE WOLL	J ANGEL		
Part # / Indication X Start (in) X Stop (in) Y Stop (in) Ave. Thk. (in) Min. Thk., R. Lig. (in) Area Reportable Max. Thk. (in) 0-12 .740° .706° .750° .750° 12-24 .740° .734° .750° 24-36 .740° .734° .750° 36-43 .740° .726° .750° 48-60 .740° .722° .750° 60-72 .740° .732° .750° 72-84 .740° .696° .750° 84-96 .735° .701° .745° 96-104.7 .735° .697° .745° Remarks: .735° .697° .745° Familier: W. H. Nelson Examiner: Analyst: W. H. Nelson Reviewer: J. B. Elder [N1]	Yo Ref. Point (Wo):										
12-24	Part # / Indication	X Start	X Stop	Y Start						Max. Thk.	
24-36	0-12	\/	(",7	()		,					
36-48	12-24						.740"	.734"		.750"	
1.740" .722" .750" .75	24-36						.740"	.734"		.750"	
1740" 1732" 1750" 172-84 1740" 1.696" 1.750" 1.745	36-48						.740"	.726"		.750"	
72-84	48-60						.740"	.722"		.750"	
Remarks:	60-72						.740"	.732"		.750*	
Remarks: [N1] See Attached Letter From J. B. Elder Examiner: W. H. Nelson Examiner: W. H. Nelson Examiner: W. H. Nelson Examiner: W. H. Nelson Examiner: M. H. Nelson Examiner: M. H. Nelson Examiner: M. H. Nelson [N1] M.	72-84						.740"	.696*		.750"	
Remarks: [N1] See Attached Letter From J. B. Elder Examiner: W. H. Nelson Examiner: WHTHEN IN1 [N1] See Attached Letter From J. B. Elder Examiner: W. H. Nelson Reviewer: J. B. Elder WHTHEN IN1	84-96						.735*	.701"		.745"	
[N1] See Attached Letter From J. B. Elder Examiner: W. H. Nelson Examiner: Analyst: W. H. Nelson Reviewer: J. B. Elder WHY Telm [N1]	96-104.7						.735*	.697"		.745"	
[N1] See Attached Letter From J. B. Elder Examiner: W. H. Nelson Examiner: Analyst: W. H. Nelson Reviewer: J. B. Elder WHY Telm [N1]											
[N1] See Attached Letter From J. B. Elder Examiner: W. H. Nelson Examiner: Analyst: W. H. Nelson Reviewer: J. B. Elder WHY Telm [N1]											
Examiner: W. H. Nelson Examiner: Analyst: W. H. Nelson Reviewer: J. B. Elder WHO THEM [N1]		ached Lette	er From J. R	Flder							
Level: <u>III</u> Date: <u>12/14/04</u> Date: Level: <u>III</u> Date: <u>02/23/05</u> Level: <u>III</u> Date:	Examiner: W. H.	Nelson	-	Lidei	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TW					Elder	
	Level: III Date: _	12/14/04	Date	:	- L	evel:	III Date: 02/2	3/05 Le	vel: III Date		

AUT	AUTOMATED ULTRASONIC P-SCAN DATA REPORT						°* (Kisei	30			
ocation: 200 E	AST TA	NK FARM		rstem:	SP-4	Exam S	Start: 2/14/04	0825	Exam	1500		
Component ID:	102-AF	,				Examin	ation Surf		Nomi Thick	nal ness: 0.7500"		
Configuration:		PLATE	то			Calibra Range:	ted	0" то 2.1:	Temp:			
Total Length Exa	amined:	104.6"	Sca	n Width:	15"			tion (Trans				
Procedure:	OCEMA (SVUT-INS	007.3	T	Rev. 2		I Type:	OTUED.		Condition:		
File Name						Transd		N/A				
/ Item #: Xo Ref. Point (L	<u></u>	/ERT.WA		114			JAL 🛛	SGL 0	DEG 🔯	ANGLE: 45°		
Yo Ref. Point (V	1" be	low horiz.	weld									
	cente	r line of 2										
Sizing Met		Angle (de	eg)	Referen	nce Cal. Si	neet		Set-U	/ File Na	ime		
1 45° SHEA 2 60° SHEA												
2 60° SHEA 3 AATT	-											
4 DUAL 0°						+	~					
7 00/20				INDICAT	TION INF	ORMATIC	N					
nd. Method	Weld Side	Depth R. Lig.	Max. Amp.	L1 (in)	Length (in)	L2 (in)	W1 (in)	Width (in)	W2 (in)	Indication Type		
	-				-							
	-	\vdash			-	-	-					
						†						
						ļ	·	1		1		
		+-+				-	<u> </u>	1				
-	+											
Remarks:		1					1	1				
Remarks: No crack I			m I B	Elder								
Examiner: W.	H. Nelson		niner:	Lidei		Analyst: W	THE PERSON NAMED IN COLUMN TWO		Reviewer:	J. B. Elder		
Level: III Dat		4	Date:		_					Date:		
COGEMA-SVUT-IN	S-007 3 Rev 3	Attachment 5					-			Rev. Dec. 03, 20		

AUTOMA	TED ULT	RASONIC REPOR		(NESS	Job# 04-41			Riser # 30		
Location: 200 EA	ST TANK F	ARM			Exa	m Start: 11/22/04	0917	Exam End:	1923	
Component ID:	02-AP				Examination Surface: Nominal Nominal Thickness: .875					
Configuration:	PLAT	E TO			Calibrated Range: 0.3" To 1.0" Temp: AMB OF					
Total Length Exami	ned: 21.9'	. 8	Scan Width:	15"	Ref. Level Correction (Trans. Corr.):					
Procedure: COG	EMA SVUT		.3	Rev 2	Mat	erial Type:	THER:	Cond	lition: N/A	
File Name:	VERT	WALL/PL	ATE 5		Tra	nsducer:		G □ ANGLE	٥	
Xo Ref. Point (Lo):	1" below h			, -	16	DOAL	SC MODE	S LI ANGLE		
Yo Ref. Point (Wo):	center line	of 24" rise	er							
Part # / Indication	X Start (in)	X Stop (in)	Y Star (in)	rt YS		Ave. Thk.	Min. Thk., R. Lig. (in)		Max. Thk.	
0-12						.860"	.795"		.870"	
12-21.9						.860"		.870*		
Remarks:										
[N1] See Atta Examiner: W. D. Level: II Date: P-Scan Limited	right	Examiner:	3. Elder	6	wh	W. H. Nelson 1776- II Date: 02/2	1	eviewer: J.B. V1] evel: <u>III</u> Date		

AUTOMATED DA	AN	Jol	0	4-41	Riser # 30			
Location: 200 EAST TANK	CEARM	System:	SP-4	Exam S	tart: 1/22/04	0906	Exam	n End: 1927
Component ID: 102-AP				Evamination Surface: Nominal				
Configuration:	ATE TO			Calibrat Range:	ted	0" to 2.47		Temp: AMB OF
Total Length Examined:	1.8"	Scan Width:	15"			tion (Trans	Corr):	O DB
Procedure: COGEMA SV			Rev. 2	Materia		TUED.		Condition:
File Name				Transd				N/A
Xo Ref. Point (Lo):	RT.WALL/P				AL 🗆 S	GL 01	DEG D	ANGLE: 45°
Yo Ref. Point (Wo):	w horiz. welc	d						
center	line of 24" ris							
	Angle (deg)	Referen	ce Cal. Sh	eet		Set-Up	/ File Na	ıme
1 45° SHEAR 2 60° SHEAR								
2 60° SHEAR 3 AATT								
4 DUAL 0°		1						
4 BONES		INDICAT	ION INFO	RMATIO	N			
nd. Method Weld Side	Depth Max R. Lig. Am		Length (in)	L2 (in)	W1 (in)	Width (in)	W2 (in)	Indication Type
						1		
		4						
Remarks:			-					
No crack like indication		B Eldor						
[N1] See Attached Le Examiner: W. D. Rurdy	Examiner:	THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS	TA	nalyst: W.	H. Nelson	, T	Reviewer	: J. B. Elder
WDharde				wh?	Jela		[N1]	
Level: <u>II</u> Date: <u>11/22/04</u>	(7)	ate:	_	evel: <u> </u> [Date: <u>02/</u>			Date:
P-Scan Limited COGEMA-SVUT-INS-007.3, Rev. 2, A	Attachment 5							Rev. Dec. 03, 20

AUTOMA		RASONIC A REPORT		(NESS	1	lob # 0	4-41	Riser # 30			
Location: 200 EA	ST TANK	FARM			Exam	Start: 02/14/05	0838	Exam End:	1516		
Component ID:	102-AP					Examination Surface: Nominal Thickness: .50					
Configuration:	PLA.	TE TO			Calib	rated	.3" то 1.0"	1 +	AMB ^O F		
Total Length Exami	ned: 90.3	" Sc	an Width:	17"	Ref. Level Correction (Trans. Corr.):						
Procedure: COC	SEMA SVU	T-INS-007.3	3	Rev 2		rial Type:	THER:		lition: N/A		
File Name:	VERT W	ALL / 2ND /	PLATE	1		sducer: DUAL S	GL 🖾 0 DE	G □ ANGLE	. 0		
Xo Ref. Point (Lo):	1" below	noriz weld				JONE L	00 2000	<u> </u>			
Yo Ref. Point (Wo):		center line o	f first pa	ss to cent	er line	of second	Inass				
Part # / Indication	X Start (in)	X Stop (in)	Y Star	rt YS	top	Ave. Thk.	Min. Thk., R. Lig. (in)	Area Reportable	Max. Thk.		
012						.490"	.440"	PIT	.505"		
-1224						.490"	.473"		.505*		
-2436						.495*	.492"		.505"		
-3648						.500"	.492"		.505*		
-4860						.500"	.471"		.510"		
-6072						.500"	.492"		.510*		
-7284						.495"	.441"	PIT	.505*		
-8490.3						.495*	.428"	P17	.505*		
								31.05			
							1				
Remarks:	ached I atta	or From L.P.	Eldor								
[N1] See Atta	Nelson	Examiner:	. Liuei	^	nalyst:	W. H. Nelson		eviewer: J. B.	Elder		
Level: III Date: 02/14/05 Date: L					evel: <u>III</u>	Date: <u>02/</u>	28/05 Le	evel: III Date:			
COGEMA-SVUT-INS-00	7.3. Rev. 2. Attac	hment 6						R	ev. Dec. 03, 200		

AUTOMATED ULTRASONIC P-SCAN DATA REPORT							Job # 04-41			Riser #		
Location: 200 EAS	ST TAN	IK FARM		System: F	SP-4	Exa	n Start: 02/14/05	0835	Exar	n End:	1519	
Component ID:	102-AP						mination Surf		Nom Thic	ninal kness:	0.5000"	
Configuration:	F	PLATE	то				brated	р" то 1.41	1	~	AMB ^o F	
Total Length Exami	ined:	90.4"	S	can Width:	17"		Level Correc	ction (Trans	. Corr):			
Procedure:	SEMA S	SVUT-INS	S-007 3		Rev. 2		Material Type: Co □ SS ☑ CS OTHER:					
File Name		T WALL				Trai	sducer:			M ANGLE	N/A : <u>45</u> °	
/ Item #: Xo Ref. Point (Lo):		ow horiz					DUAL 🔯	SGL 0	JEG (ANGLE	45	
Yo Ref. Point (Wo):				f first na	ss to ce	nter line	e of secon	d nass				
Sizing Method		Angle (de			nce Cal. S		0.300011		/ File N	ame		
1 45° SHEAR			3,									
2 60° SHEAR												
3 AATT												
4 DUAL 0°												
				CHARLES AND	TION INF	ORMA	SHOWER THE SECTION OF THE					
nd. Method	Weld Side	Depth R. Lig.	Max. Amp.	(in)	Length (in)	L2 (in)	W1 (in)	Width (in)	(in)	Indic	ation Type	
						1						
Remarks:												
No crack like				Eldon								
[N1] See Atta			m J. B	. Elder	1	Analyst:	W. H. Nelson			r: J. B. E	lder	
Level: III Date:	02/14/05	_	Date):		Level: III Date: 02/28/05 Level: III Date:						
COGEMA-SVUT-INS-00											Dec. 03, 200	

AUTOMA		RASONIC REPORT		NESS		Job # 04	1-41	Riser#			
Location: 200 EA	ST TANK	FARM			Exa	am Start: 12/13/04	0909	Exam End:	1948		
Component ID:	102-AP					Examination Surface: Nominal Thickness: .5					
Configuration:	PLAT	re ^{TO}			Ca	librated	.3" то 1.0"	THE REPORT OF THE PARTY OF THE	AMB °F		
Total Length Exami	ned: 88.5	" Sc	an Width:	15"		f. Level Correct	on (Trans. Co	orr.):	0 DB		
Procedure:		T-INS-007.3		Rev 2		terial Type:	THER:	Condition:			
File Name:	VERT.WALL/2 ND /PLATE 2 Transducer:							S □ ANGLE	0		
Xo Ref. Point (Lo):		noriz. weld			1 8	S DOAL G	SC MODE	ANOCE			
Yo Ref. Point (Wo):	17" from (center of 1st	pass to	center of	2 nd p	ass					
Part # / Indication	X Start (in)	X Stop (in)	Y Star (in)		top	Ave. Thk.	Min. Thk., R. Lig. (in)	Area Reportable	Max. Thk. (in)		
0-12		(11) (11) (11) (11) (12) (13)							.500"		
12-24						.490"	.440"	PIT	.500*		
24-36						.490"	.479"		.500"		
36-48						.490"	.430"	PIT	.500"		
48-60	48.7	48.9	7.1	7.	.4	.490"	.430"	YES	.500*		
48-60	56.2	56.5	7.0	7	.6	.490"	.430"	YES	.500*		
60-72						.490"	.487"		.500"		
72-84						.490"	.438"	PIT	.500*		
84-88.5						.485"	.416"	PIT	.500"		
Remarks: [N1] See Atta	eched Latte	r From I B	Elder								
Examiner: W. H.		Examiner:	Liuei		nalyst	: W. H. Nelson	Re IN	viewer: J. B. E	Ider		
Level: III Date: _	12/13/04	Date		_ L	evel: _	III Date: <u>02/2</u>	3/05 Le	vel: III Date:			
COGEMA-SVUT-INS-007	7.3, Rev. 2, Attach	ment 6			-			Re	ev. Dec. 03, 200		

AUTOMATEI D	AN .	Job # 04-41			Riser # 30			
Location: 200 EAST TAN	K FARM	System:	SP-4	Exam S	Start: 2/13/04	Exam	End: 1943	
Component ID: 102-AP					ation Surfa	ce:	Nomi	nal ness: 0.5000"
Configuration:	PLATE TO			Calibra Range:	ted	" то 1.41	<u> </u>	Temp: AMB ^O F
Total Length Examined:	38.4"	Scan Width:	15"	Ref. Le	vel Correc	tion (Trans.	Corr):	O DB
Procedure: COGEMA S	VUT-INS-00		Rev. 2	Materia SS	Condition: N/A			
File Name / Item #: VEF	T.WALL/2N	D/PLATE 2		Transd	ucer:		EG D	ANGLE: 45°
Xo Ref. Point (Lo): 1" bel	ow horiz. we	ld						
Yo Ref. Point (Wo): center	r line of 24" r	iser						
Sizing Method	Angle (deg)	Referen	ice Cal. Sh	eet		Set-Up	/ File Na	ime
1 45° SHEAR								
2 60° SHEAR								
3 AATT								
4 DUAL 0°								
T Was	D 1 14-	CONTRACTOR OF STREET	ION INFO		Particular Control	Width	IAD	r
nd. Method Weld Side	Depth Ma R. Lig. An	Marine Committee of the	Length (in)	(in)	W1 (in)	(in)	W2 (in)	Indication Type
			-	 				
				1				
Remarks:			-					
No crack like indicate [N1] See Attached L		. B. Elder						
Examiner: W. H. Nelson	Examiner		A	nalyst: W	H. Nelson		Reviewer	: J. B. Elder
Level: III Date: 12/13/04		Date:	_ .	evel: []]	Date: 01/			Date:
COGEMA-SVUT-INS-007.3, Rev. 2	Attachment 5							Rev. Dec. 03, 2

AUTOMA		RASONIC REPORT	NESS	Jo	Job # 04-41			Riser # 30			
Location: 200 EA	ST TANK	FARM			Exam	Start: 12/13/04	0909	Exa	am End:	1940	
Component ID:	102-AP					nation Surfa			minal ickness:	.5625"	
Configuration:	PLA	TE TO P	LATE		Calibra Range	Calibrated O. 27 TO 4 OT Temp:					
Total Length Exami		10	can Width:	15"	Ref. Le		tion (Trans.			0 DB	
Procedure: COC		T-INS-007.3	3	Rev 2		al Type:	OTHER:		Cond	A CANCELLA PROPERTY AND A STATE OF THE PARTY	
File Name:	VERTW	ALL / 2 ND /	PLATE 3		Transo	lucer:		nec.	☐ ANGLE	0	
Xo Ref. Point (Lo):	1" below h				1 20	DAL 13	GL MU	JEG	L ANGLE		
Yo Ref. Point (Wo):	17" from (center line o	f first pas	ss to cen	ter line o	of second	pass				
Part # / Indication	X Start (in)	X Stop (in)	Y Start (in)	YS		Ave. Thk. (in)	Min. Thi R. Lig. (i		Area eportable	Max. Thk. (in)	
0-12				.565"	.505"		PIT	.570"			
12-24				.565*	.506"		PIT	.570*			
24-36						.565*	.509*			.570*	
36-48						.565"	.507*			.570"	
48-60						.565"	.510*			.570"	
60-72						.565*	.512"			.570"	
72-84						.565*	.507"			.570*	
84-89.2						.565"	.515*			.570"	
				+-							
				-				+			
Remarks: [N1] See Atta	ched Lette	r From I R	Elder								
Examiner: W. H.	Nelson	Examiner:	. LIGGI		Leader Williams	7. H. Nelson		Review	ver: J.B.1	Elder	
Level: III Date:				Level: III Date: 02/28/05 Level: III Date:							
COGEMA-SVUT-INS-00	7.3, Rev. 2, Attach	ment 6							R	ev. Dec. 03, 20	

AUTOMAT	J	Job# 04-41			Riser #					
Location: 200 EAST T	ANK FARM	System:	PSP-4	Exam	Start: 12/13/04	0915	Exar	n End: 1943		
Component ID: 102-	AP			Examination Surface: Nominal Thickness: 0.5625						
Configuration:	PLATE TO		•	Calibra	ated	0" то 1.59	Temp:			
Total Length Examined:	89.1"	Scan Width	15"			tion (Trans.	Corr):	Corr): 0 DB		
Procedure:	A SVUT-INS-C	007.3	Rev. 2		al Type:	THED.	Condition:			
File Name	ERT.WALL/2			Transduser						
Xo Ref. Point (Lo):	pelow horiz. w			1 00	OAL M	oc UV	EG L	ANGLE: 45°		
Yo Ref Point (Wo)	from center of		to center (of 2 nd pa	ec					
Sizing Method	Angle (deg)		ence Cal. St		33	Set-Up	/ File N	ame		
1 45° SHEAR	1 0 (0)									
2 60° SHEAR										
3 AATT										
4 DUAL 0°										
		A STATE OF THE PARTY OF	TION INFO	ORMATI						
nd. Method Weld		Max. L1 Amp. (in)	Length (in)	(in)	W1 (in)	Width (in)	W2 (in)	Indication Type		
		-+-	-			-				
					+					
					4			_		
++-										
					†					
					1					
Remarks: No crack like indi	oations									
[N1] See Attache		J. B. Flder								
Examiner: W. H. Nelso	THE RESERVE THE PERSON NAMED IN COLUMN 2 IS NOT THE OWNER.			Analyst: W. H. Nelson Reviewer: J. B. E.				r: J. B. Elder		
Level: III Date: 12/13	3/04	Date:		Level: III Date: 02/23/05 Level: III Date:				Date:		
COGEMA-SVUT-INS-007.3, Re								Rev. Dec. 03, 20		

AUTOMA	Property and the second	RASONIC REPORT		NESS		Job# 04	Riser # 30				
Location: 200 EA	ST TANK	FARM			Exa	m Start: 12/15/04	0936		1952		
Component ID:	102-AP					Examination Surface: Nominal Thickness: .75					
Configuration:	PLA	TE TO			Calibrated O.3" To 4.0" Temp: ANAD OF						
Total Length Exami	ned: 104.	6" Sc	an Width:	15"	Range: 0.3 10 1.0 AIVIB F Ref. Level Correction (Trans. Corr.): 0 DB						
Procedure: COC		T-INS-007.3		Rev 2	Material Type: Condition: ☐ SS ☐ CS OTHER: N/A						
File Name:	VERT	WALL/2 ND /P	LATE4		Tran	nsducer:		G □ ANGLE	0		
Xo Ref. Point (Lo):		noriz. weld			ما ا	DOAL	SC MODE	3 HANGLE			
Yo Ref. Point (Wo):		center of 1st	pass to	center of	2 nd pa	ass					
Part # / Indication	X Start (in)	X Stop (in)	Y Star (in)		top	Ave. Thk.	Min. Thk., R. Lig. (in)	Area Reportable	Max. Thk.		
0-12						.740"	.684"		.750"		
12-24						.740"	.736"		.750"		
24-36						.740"	.684"		.750*		
36-48						.740"	.690"		.750*		
48-60						.740"	.729"		.750"		
60-72						.740"	.691"		.750*		
72-84						.740"	.731"		.750"		
84-96						.740"	.684"		.750"		
96-104.6						.735*	712"		.745"		
Remarks: [N1] See Atta			. Elder								
Examiner: W. H.		Examiner:				W. H. Nelson		eviewer: J. B.	Elder		
WHI Meh INII					111						
Level: <u>III</u> Date:	12/15/04	Date	:	- L	evel: <u>l</u>	II Date: <u>02/2</u>	23/05 Le	vel: III Date:			
COGEMA-SVUT-INS-00	7.3. Rev. 2. Attacl	hment 6						R	ev. Dec. 03, 200		

AUTOMATED ULTRASONIC P-SCAN DATA REPORT						ľ	Job# 04-41			Riser#		
Location: 200 EAS	ST TAN	K FARM		System: P	SP-4		Exam Start: Exam E 12/15/04 1021					
Component ID:	02-AP					Examination Surface: Nominal Thickness: 0.75						
Configuration:	F	LATE	го			Calibr Range	ated	0" то 2.12		Temp: AMB OF		
Total Length Exami	ned:	104.5"	S	an Width:	15"	Ref. L	evel Correc	tion (Trans.	ns. Corr): 0 DB			
Procedure:	FMA S	VUT-INS	-007.3		Rev. 2		ial Type:	OTHER:	Condition: N/A			
File Name		T.WALL				Trans	ducer:		F			
Item #: Xo Ref. Point (Lo):		ow horiz.		LXIL 4		1 0	DUAL 🛛	SGL 00	EG L	■ ANGLE: 45		
Yo Ref. Point (Wo):						e and an						
Sizing Method		om cente Angle (de			nce Cal. S		SS	Set-Lin	/ File N	ame		
1 45° SHEAR		Aigie (de	·g/	releter	ilice Gai. G	ilect		Оек-Ор	71 110 140	ame		
2 60° SHEAR												
3 AATT												
4 DUAL 0°												
					TION INF	ORMATI	ON					
nd. Method	Weld Side	Depth R. Lig.	Max. Amp.	(in)	Length (in)	(in)	(in)	Width (in)	W2 (in)	Indication Type		
						1	+			1		
					-	+						
				-	-		-					
						+		+-+		-		
					1 -							
Remarks: No crack like	indicat	ions										
				- 13								
[N1] See Atta Examiner: W. H.		Name and Address of the Owner, where	m J. B niner:	. Elder			V. H. Nelso	n F	Reviewe	: J. B. Elder		
WHYL	4					WH	Nu	ر ا	[N1]			
Level: III Date:	12/15/04		Date	:	_					el: III Date:		
COGEMA-SVUT-INS-00	728	Attraction								Rev. Dec. 03, 20		

AUTOMA		RASONIC REPORT		NESS		Job# O4	1-41	30 Kiser #		
Location: 200 EA	ST TANK	ARM			Exa	m Start: 11/23/04	1030	Exam End:	1540	
Component ID:	102-AP				Exa	mination Surfac	e: TPAINTED	Nominal Thickness:	.875"	
Configuration:	PLAT	E TO			Calibrated Range: 0.3" TO 1.0" Temp: AMB OF					
Total Length Exami	ned: 21.3	, Sc	an Width:	15"	Ref. Level Correction (Trans. Corr.):					
Procedure: COG	SEMA SVU	T-INS-007.3		Rev 2		terial Type:] SS ⊠ CS 01	HER:	Cond	The second second	
File Name:	VERT.	VALL/2 ND /P	LATE5			nsducer:	SL 🖾 O DEC	S □ ANGLE	. •	
Xo Ref. Point (Lo):		oriz. weld								
Yo Ref. Point (Wo):		enter of 1st	pass to	center of	2 nd p	ass				
Part # / Indication	X Start	X Stop	Y Start	YS	top	Ave. Thk.	Min. Thk.,	Area	Max. Thk.	
0-12	(in)	(in)	(in)	(ir	1)	(in) .855"	R. Lig. (in) .809"	Reportable	(in) .875"	
12-21.3									.870*	
								1		
						ļ.,				
		<u> </u>								
		1				 			-	
						+		+	!	
							 			
Remarks:								•		
[N1] See Atta		r From J. B.	Elder							
Examiner: VV. D.	Surdy 1	Examiner:			The state of	W. H. Nelson	Re	viewer: J. B. I	Elder	
MDH	tudy			4	N	Dele	IN	11		
Level: II Date:	11/23/04	Date	:	_	evel: _	III Date: 02/2	3/05 Le	vel: III Date:		
P-Scan Limited COGEMA-SVUT-INS-007.3, Rev. 2, Attachment 6								R	ev. Dec. 03, 200:	

AUT		D ULTRA ATA REI			CAN	Jo	b# C	4-41	30 Riser #		
ocation: 200 E	AST TA	NK FARM	S	ystem:	SP-4	Exam S	start: 1/23/04	1038	Exar	n End: 1543	
Component ID:	102-AF					Examin	ation Surf		Nom		
Configuration:		PLATE 1	0			Calibra Range:	ted	0" то 2.47	.	Temp: AMB ^O F	
Total Length Ex	amined:	21.3"	Sc	an Width:	15"			tion (Trans.	Corr):	0 DB	
Procedure:	OGEMA S	SVUT-INS	-007.3		Rev. 2		I Type:	THER.		Condition: N/A	
File Name / Item #:		RT.WALL/				Transd	ucer:		=	MANGLE: 45°	
X _o Ref. Point (L	o):	low horiz.				1 000	AL M	GC [] UD	EG L	A ANGLE. 40	
Yo Ref. Point (V	V-1·	om center		nass to	center of	2 nd pass					
Sizing Met		Angle (de			nce Cal. Sh			Set-Up	/ File N	ame	
1 45° SHEA											
2 60° SHEA	R										
3 AATT											
4 DUAL 0°											
					TION INFO						
nd. Method	Weld Side	Depth R. Lig.	Max. Amp.	L1 (in)	Length (in)	(in)	W1 (in)	Width (in)	(in)	Indication Type	
	+	1		†							
	ļ										
-	+	-		-				1			
				+			1	+			
					<u> </u>	<u> </u>	 	$\downarrow \longrightarrow$			
				<u> </u>	<u> </u>		1			<u> </u>	
Remarks: No crack			m P	Eldor							
[N1] See /	and the second s	Letter Pro	-	Eldel	A	nalyst: W	. H. Nelson		eviewe	r: J. B. Elder	
Level: II Da		10	Date		_	evel: <u>III</u>	Date: <u>02/</u>			Date:	
COGEMA-SVUT-IN		Attachment 5			-					Rev. Dec. 03, 20	

A	DATA REPORT						Job# 04-41		Rise	er# 30
Location: 20	O EAST TA	NK FARM		System: P	SP-4	Exam S	Start: 01/03/05	1414	Exa	m End: 1930
Component	ID: 102-A	P				Examir	ation Surf	The state of the s		ninal kness: 0.5000"
Configuration			TO P	LATE		Calibra Range:	ted	D" TO 1.41		Temp: AMB OF
Total Length	Examined:	87.9"	S	can Width:	5.7"			tion (Trans	. Corr):	<u>0</u> DB
Procedure:	COGEMA	SVUT-INS	-007.3		Rev. 2		I Type: ⊠ CS	OTHER:		Condition: N/A
File Name / Item #:		RT.WELD)/2 ND /P	LATE 2		Transd		SGL 🗆 0	DEG	⊠ ANGLE: 45°
Xo Ref. Poin	t (Lo): 1" b	elow horiz.	weld							
Yo Ref. Poin	t (Wo): cent	er line of w	reld							
	Method	Angle (de	eg)	Referen	nce Cal. Sh	eet		Set-U	/ File N	lame
1 45° Sh 2 60° Sh			-+							
2 60° SH 3 AATT	1EAR									
4 DUAL	0°									
				INDICAT	ION INFO	RMATIC	N			
Ind. Meth	od Weld Side	Depth R. Lig.	Max. Amp.		Length (in)	L2 (in)	W1 (in)	Width (in)	W2 (in)	Indication Type
							<u> </u>			
										1
									-	
					+					
Remarks:										
	ck like indic		- I B	Eldas						
A PARKET OF THE	W. H. Nelson	AND DESCRIPTION OF THE PARTY OF		Ciuei	A	nalyst: W	H. Nelson		Reviewe	r: J. B. Elder
	Date: 01/03/	05	Date	:	_ -	00.0	Date: <u>02/</u>			I Date:
	IT-INS-007.3, Rev.									Rev. Dec. 03, 200

AUTOMA'	TED ULTRAS DATA REP		CAN	Jo	b# . (04-41	Riser # 30		
Location: 200 EAST	TANK FARM	System:	PSP-4	Exam S	Start: 1/04/05	0950	Exar	n End: 1353	
Component ID: 102-	-AP				ation Surf	ace:	Nom	inal kness: 0.5625"	
Configuration:	PLATE TO	PLATE		Calibra Range:	ted	0" то 1.59		Temp: AMB OF	
Total Length Examined:	87.4"	Scan Width:	5.9"			tion (Trans	. Corr):	O DB	
Procedure: COGEM	A SVUT-INS-0	007.3	Rev. 2	Materia III SS	Type: ⊠ CS	OTHER:		Condition: N/A	
File Name / Item #:	/ERT.WELD/2	ND/PLATE 3		Transd	ucer:		DEG [ANGLE: 45°	
Xo Ref. Point (Lo):	below horiz. w	reld							
Yo Ref. Point (Wo):	nter line of wel								
Sizing Method	Angle (deg)	Refere	nce Cal. Sh	eet		Set-Up	/ File Na	ame	
1 45° SHEAR									
2 60° SHEAR									
3 AATT									
4 DUAL 0°									
			TION INFO			T T			
nd. Method We Sid		Max. L1 Amp. (in)	Length (in)	(in)	W1 (in)	Width (in)	W2 (in)	Indication Type	
			1						
Remarks: No crack like ind	ications								
[N1] See Attache									
Examiner: W. H. Nels WHY You	on Examine	er:		Analyst: W. H. Nelson Reviewer: J. B. Elder				: J. B. Elder	
Level: III Date: 01/0	4/04	Date:		vel: <u>III</u> C				Date:	
COGEMA-SVUT-INS-007.3, R	ev. 2. Attachment 5							Rev. Dec. 03, 200	

	D ULTRAS	HATTER DATE OF THE PARTY OF THE	CAN	100	ob#	04-41			
Location: 200 EAST TA	NK FARM	System:	PSP-4	Exam S	Start: 01/03/05	1246	Exar	n End: 1952	
Component ID: 102-A	Р			Examir OD	nation Sur	ace:	Nom	inal kness: 0.7500"	
Configuration:	PLATE TO	PLATE		Calibra Range:	ited	0" то 2.12		Temp: AMB ^O F	
Total Length Examined:	103.4"	Scan Width	5.9"			ction (Trans.	Corr):	O DB	
Procedure:	SVUT-INS-00	773	Rev. 2		al Type:	OTUED:		Condition:	
File Name	RT.WELD/2			Transd	lucer:		=	N/A ANGLE: 45°	
Xo Ref. Point (Lo):				☐ DUAL ☑ SGL ☐ 0 DEG ☑ ANGLE:					
Yo Ref. Point (Wo):	elow horiz. we								
	er line of welc		ence Cal. Sh	Т		Set Un	/ Ello Ni		
Sizing Method 1 45° SHEAR	Angle (deg)	Keiere	nice Cal. Sh	561		Set-Up	rue Na	aine	
2 60° SHEAR		-							
3 AATT									
4 DUAL 0°									
		INDICA	TION INFO	RMATIC	N				
nd. Method Weld Side		ax. L1 np. (in)	Length (in)	L2 (in)	W1 (in)	Width (in)	W2 (in)	Indication Type	
					-				
	+								
						$\vdash \vdash$		 	
	1					+-+			
Remarks:									
Remarks: No crack like indica [N1] See Attached		B Flder							
Examiner: W. H. Nelson WH Dec	Examiner			oalyst: W.	H. Nelson		eviewer:	J. B. Elder	
Level: III Date: _01/03/0	5	Date:			Date: <u>02/7</u>			Date:	
COGEMA-SVUT-INS-007.3, Rev.	2 Attachment 5			Rev. L					

AUT			ULTRASONIC P-SCAN ATA REPORT 04-4						30			
Location: 200 i	EAST TAN	NK FARM	Sys	stem:	SP-4	Exam S	Start: 01/03/05	1414.	Exam	201001201111111111111111111111111111111	1930	
Component ID:	102-AF	,				Examin	ation Surf		Nomi	nal	0.8750"	
Configuration:		PLATE T	O PL	ATE		Calibra Range:		0" to 2.47'		Temp:	AMB OF	
Total Length Ex	amined:	21.5"	Scar	n Width:	5.6"	Ref. Le	vel Correc	tion (Trans.	Corr):	0	DB	
Procedure:	OGEMA S	SVUT-INS	-007.3		Rev. 2	Materia	I Type:	OTHER:			Condition: N/A	
File Name		RT.WELD		ATE 5		Transd	ucer:		=	ANGLE:	45°	
X _o Ref. Point (L	9):	low horiz.				1.00	AL MI	oc		A MIOLL.		
Yo Ref. Point (V	Vo):	r line of w										
Sizing Met		Angle (de		Referen	nce Cal. Sh	eet		Set-Up	File Na	me		
1 45° SHEA												
2 60° SHEA	R											
3 AATT												
4 DUAL 0°				IDICAT	TION INFO	DMATIC						
	Weld	Depth	Max.	L1	Length	L2	W1	Width	W2			
nd. Method	d. Method Weld Side	R. Lig.	Amp.	(in)	(in)	(in)	(in)	(in)	(in)	Indica	tion Type	
								\vdash				
							 					
Remarks:	1	1			1		<u> </u>					
No crack I												
Examiner: W		Exam		lder	Ai /	nalyst: W.	H. Nelsor		eviewer:	J. B. Ek	ler	
Level: II Dat		<u>a</u> –	Date: _		_ Le	Level: III Date: 02/23/05 Level: III Date:						
P-Scan Limit		Attachment 5								-	Dec 03 20	

AUTOMA	TED ULT	RASONI REPOR		NESS		Job# 04	4-41	Riser # 30		
Location: 200 EA	ST TANK	FARM			Exa	m Start: 02/15/05	0849	Exam End:	1530	
Component ID:	102-AP					mination Surfac		Nominal Thickness:	.500	
Configuration:	PLA	TE TO	PLATE		Calibrated Range: 0.3" TO 1.0" Temp: AMB OF					
Total Length Exami	ned: 89.5		Scan Width:	10.5"	Ref. Level Correction (Trans. Corr.):					
Procedure: COG	EMA SVU		.3	Rev 2	Material Type: Condition: N/A					
File Name:	VERT	.WELD/P	LATE 2		Tra	nsducer:		G □ ANGLE	0	
Xo Ref. Point (Lo):		noriz. weld			1 6	DOAL LIGH	SE AVE	O MINGE		
Yo Ref. Point (Wo):	center line									
Part # / Indication	X Start (in)	X Stop (in)	Y Start	t YS		Ave. Thk.	Min. Thk., R. Lig. (in)		Max. Thk. (in)	
0-12						.495"	.445"	PIT	.505"	
12-24						.495"	.426"	PIT	.505*	
24-36						.495"	.440"	PIT	.505"	
36-48						.495"	.424"	PIT	.505*	
48-60						.495"	.440"	PIT	.505"	
60-72						.495"	.430"	PIT	.505*	
72-84						.495"	.426"	PIT	.505"	
84-89.5						.490"	.406"	PIT	.500*	
Remarks: [N1] See Atta	achad l atte	er From 1	R Elder							
Examiner: W. H.	الوالدان ويورون والمراجع المراجع	Examiner:	D. Lidel	7 10 111 111		W. H. Nelson		eviewer: J.B.	Elder	
Level: III Date:	02/15/05	Da	ate:	_ L	evel: _	III Date: <u>02/2</u>	28/05 Lo	evel: <u>III</u> Date:		
COGEMA-SVUT-INS-00	73 Pay 2 Attac	hment 6						- A	ev. Dec. 03, 200	

COGEMA-SVUT-INS-007.3, Rev. 2, Attachment 6

TAMOTUA 1	D ULTRAS		CAN	Jo	b# C	Riser	* 30			
Location: 200 EAST TA	NK FARM	System:	PSP-4	Exam S	tart: 2/15/05	0842	Exam	End: 1527		
Component ID: 102-A	P				ation Surf	ace:	Nomi D Thick	nal ness: 0.5000"		
Configuration:	PLATE TO	PLATE		Calibrat Range:	ted	0" то 2		Temp: AMB OF		
Total Length Examined:	87.8"	Scan Width	h: 10.2"			tion (Tran	s. Corr):	orr): 0 DB		
Procedure: COGEMA	SVUT-INS-00	07.3	Rev. 2	Materia	I Type: ⊠ CS (OTHER:		Condition: N/A		
File Name / Item #:	VERT.WELD/	PLATE 2		Transd	ucer:		DEG D	ANGLE: 60°		
X Ref Point (1 a)	elow horiz. we	əld				20 2				
Yo Ref. Point (Wo):	er line of weld									
Sizing Method	Angle (deg)		ence Cal. St	neet		Set-U	p / File Na	me		
1 45° SHEAR										
2 60° SHEAR										
3 AATT										
4 DUAL 0°		lunia.								
Weld	Depth M		ATION INFO	DRMATIO L2	W1	Width	W2			
nd. Method Side					(in)	(in)	(in)	Indication Type		
	-									
						-				
Remarks:										
No crack like indicate [N1] See Attached	X.	J. B. Elder								
Examiner: W. H. Nelson				nalyst: W.		1	Reviewer:	J. B. Elder		
Level: <u>III</u> Date: <u>02/15/0</u>	05	Date:		evel: <u> </u> [Date: <u>02/</u>	28/05		Date:		
COGEMA-SVUT-INS-007.3, Rev.	2 Attachment 5							Rev. Dec. 03, 20		

AUTOMA	TED ULT	RASONIC REPORT	SS	Job# Riser#						
Location: 200 EA	ST TANK F	ARM			Exa	m Start: 12/21/04	0848	Exan	n End:	1456
Component ID:	02-AP					amination Surfac		Nom	inal cness:	.5625
Configuration:	PLAT	E TO PI	_ATE		Calibrated Range: 0.3" TO 1.0" Temp: AME					
Total Length Exami	ned: 87.6"	So	an Width:	11.1"	Re	f. Level Correction	on (Trans, C	orr.):		0 DB
Procedure: COG	SEMA SVUT	r-INS-007.3	, R	ev 2	Material Type: Condition: ☐ SS ☐ CS OTHER: N/A					
File Name:	VERT	.WELD/PLA	ATE 3			nsducer:	L 🛛 O DEC	а г	ANGLE	. •
Xo Ref. Point (Lo):	1" below h				1.8	S BOAL GO	E MODE		AltoLL	
Yo Ref. Point (Wo):										
Part # / Indication	X Start (in)	X Stop (in)	Y Start (in)	YS (ir		Ave. Thk.	Min. Thk., R. Lig. (in)		Area oortable	Max. Thk. (in)
0-12						.585"	.518"			.595"
12-24						.585"	.522"			.595"
24-36						.590"	.524"			.595"
36-48						.590"	.519"			.595"
48-60						.590"	.528"			.595*
60-72						.590"	.515"			.595"
72-84						.585"	.522"			.595"
84-87.6						.585*	.519"			.590"
Remarks:								1		
[N1] See Atta		r From J. B	. Elder	I A	nalys	t: W. H. Nelson	R	eviewe	er: J.B.	Elder
MPH	Lybor		a:	_	N	111 Date: 02/2	l	N1] evel: <u>I</u>	II Date:	
Level: <u>II</u> Date: <u>12/21/04</u> Date: P-Scan Limited										

Rev. Dec. 03, 2003

	AUTOMATED ULTRASONIC P-SCAN DATA REPORT						Job# 04-41 Riser# 3				
Location: 200 EAST TA	NK FARM	System	n: PSP-4	Exam	Start: 12/21/04	0905	Exam	End: 1507			
Component ID: 102-A	P			Exam	ination Surf	ace:	Nomir Thick				
Configuration:	PLATE TO	PLATI	Ε	Calibr	ated	0" то 2.25	. 1	emp: AMB oF			
Total Length Examined:	85.3"	Scan W	/idth: 10.7	Ref I		ction (Trans.	Corr):	<u>0</u> DB			
Procedure: COGEMA	SVUT-INS-	007.3	Rev. 2		ial Type:	OTHER:		Condition: N/A			
File Name / Item #:	VERT.WEL	D/PLATE	3	Trans	ducer:		EG 🛭	ANGLE: 60°			
Xo Ref. Point (Lo): 1" be	elow horiz. \	weld									
Yo Ref. Point (Wo): cent	er line of we	eld									
Sizing Method	Angle (deg) R	eference Cal.	Sheet		Set-Up	/ File Na	me			
1 45° SHEAR 2 60° SHEAR											
2 60° SHEAR 3 AATT											
4 DUAL 0°											
		IND	ICATION IN	FORMATI	ON						
Ind. Method Weld Side	Depth R. Lig.		L1 Leng in) (in)		W1 (in)	Width (in)	W2 (in)	Indication Type			
0											
No crack like indicates [N1] See Attached		n.J.B.Fld	er	. 1							
Examiner: W. D. Rurdy	Exami		J.		V. H. Nelson	1	eviewer: N1]	J. B. Elder			
Level: II Date: 12/21/	24 ()	Date:		Level: <u>III</u>	Date: <u>02/</u>	28/05 L	evel: <u>III</u>	Date:			

AUTOMATED ULTRASONIC THICKNESS DATA REPORT						Job# Riser # 30				
Location: 200 EA	ST TANK I	ARM			Ex	am Start: 12/06/04	1022	Exam End:	1922	
Component ID:	02-AP				Ex	amination Surfac	ce:	Nominal Thickness:	.750"	
Configuration:	PLAT	E TO PI	ATE		Calibrated Range: 0.3" TO 1.0" Temp: AMB					
Total Length Exami	ned: 103.	7" So	an Width:	11.9"		f. Level Correcti		orr.):	0 DB	
Procedure: COG		T-INS-007.3	3	Rev 2		aterial Type:	THER:	Cond		
File Name:	VERT	:WELD/PLA	ATE 4		Tra	ansducer:		S □ ANGLE	0	
Xo Ref. Point (Lo):		oriz. weld				ADONE 130	st Money	LIANGLE	•	
Yo Ref. Point (Wo):										
	X Start	X Stop	Y Start	Ys	top	Ave. Thk.	Min. Thk.,	Area	Max. Thk.	
Part # / Indication	(in)	(in)	(in)	(ir	1)	(in)	R. Lig. (in)	Reportable	(in)	
0-12	6.988	8.946	1.1	2.		.730"	.651"	YES	.750"	
0-12 9.53 12 3.36 5.31 .730"								YES	.750"	
0-12	10.16	10.99	.97	1.3	32	.730"	YES	.750"		
12-24						.730*	.635*	PIT	.750*	
24-36	33.77	33.89	-2.76	-3.	05	.730"	.656"	YES	.750*	
24-36	34.59	34.81	1.0	1.2	29	.730"	.663"	YES	.750*	
36-48						.730"	.640"	PIT	.750"	
48-60						.730"	.630"	PIT	.750"	
60-72						.730"	.641"	PIT	.750"	
72-84						.730"	.681"		.750"	
84-96						.730"	.657"	PIT	.750*	
96-103.7						.720"	.664"	PIT	.740"	
Remarks:			E 14							
[N1] See Atta Examiner: W. H.		r From J. B. Examiner:	Elder			t: W. H. Nelson	Re	viewer: J.B.I	Elder	
Level: III Date: _	12/06/04	Date	:	- L	evel:	III Date: <u>02/2</u>	8/05 Lev	vel: <u>III</u> Date:		
COGEMA-SVUT-INS-00	7.3, Rev. 2, Attach	ment 6	one i	on the bar				R	ev. Dec. 03, 20	

	ED ULTRAS DATA REPO		CAN	Jo	ь # С	4-41		
ocation: 200 EAST TA	NK FARM	System:	PSP-4	Exam S	Start: 2/06/04	1011	Exan	n End: 1916
Component ID: 102-A	.P				ation Surf	ace:	Nom	inal kness: 0.7500"
Configuration:	PLATE TO	PLATE		Calibrat Range:	ted	0" то 3"		Temp: AMB ^O F
Total Length Examined:	101.7"	Scan Widtl	n: 11.5"			tion (Trans.	Corr):	<u>0</u> DB
Procedure:	SVUT-INS-0	107.3	Rev. 2	Materia				Condition:
File Name				Transd			7	N/A
Xo Ref. Point (Lo):	VERT.WELD				JAL 🛛	SGL 00	EG [ANGLE: 60°
1" b	elow horiz. w							
cen	ter line of wel							
Sizing Method	Angle (deg)	Refer	ence Cal. St	neet		Set-Up	/ File Na	ame
1 45° SHEAR 2 60° SHEAR					-			
2 60° SHEAR 3 AATT	 		-					
4 DUAL 0°	ļ							
4 BOAL 0	.	INDICA	ATION INFO	DRMATIC	N			
nd. Method Weld		Max. L1 Amp. (in)	Length (in)	L2 (in)	W1 (in)	Width (in)	W2 (in)	Indication Type
	4-4-							
			4		-	<u> </u>		
					-			
++-	+-+			+	-	+ +		
	1				<u> </u>			
Remarks:								
No crack like indic		I B Elder						
[N1] See Attached Examiner: W. H. Nelson				unalyst: W				: J. B. Elder
Level: III Date: 12/06	04	Date:		Level: Date: Date: Date:				Date:
COGEMA-SVUT-INS-007.3, Rev							L I I	Rev. Dec. 03, 20

AUTOMA		RASONIC REPORT		SS		Job # 04	1-41	1 Riser # 30		
Location: 200 EA	ST TANK F	ARM			Exa	am Start: 12/20/04	0919	Exam End:	2304	
Component ID:	02-AP					amination Surfa	ce:	Nominal Thickness:	.875"	
Configuration:	PLAT		ATE		Calibrated Range: 0.3" TO 1.0" Temp: AMB OF					
Total Length Examin	ned: 20.5"	Sc	an Width:	11.6"		f. Level Correct	on (Trans. Co		0 DB	
Procedure: COG	EMA SVUT	T-INS-007.3	Re	2		terial Type:]SS ⊠ CS O	THER:	Cond	ition: N/A	
File Name:	VERT.	WELD/PLA	TE 5			ansducer: ☑ DUAL ☐ SC	SL 🖾 O DEC	G □ ANGLE	·°	
Xo Ref. Point (Lo):	1" below h	oriz. weld								
Yo Ref. Point (Wo):	center line	of 24" riser								
Part # / Indication	X Start (in)	X Stop (in)	Y Start (in)	Y Si		Ave. Thk. (in)	Min. Thk., R. Lig. (in)	Area Reportable	Max. Thk. (in)	
0-12						.870"	.822"		.880"	
12-20.5						.865"	.802"		.875"	
								<u> </u>		
					٠,					
Damadia							l			
Remarks:	ahod I att	From 1.5	Eldor							
[N1] See Atta		Examiner:	Elder	Ar	nalyst	W. H. Nelson	Re	viewer: J.B.E	lder	
Level: II Date: _	12/20/04	Date		Le	evel:	III Date: 03/0		vel: III Date:		
P-Scan Limited COGEMA-SVUT-INS-007	2 Paul 2 Attache	neat 6						Re	v. Dec. 03, 2003	

AUTO			TRASONIC P-SCAN REPORT 04-4						30				
Location: 200 E.	AST TAI	NK FARM		System:	PSP-4	Exam S	Start: 2/20/04	0929	Exan	n End: 2310			
Component ID:	102-AF	,				Examin OD	ation Surf	ace:	Exam End: 2310 Nominal Thickness: 0.875 O				
Configuration:		PLATE	TO P	LATE		Calibra Range:		0" то 2.47	.	Temp: AMB OF			
Total Length Exa	mined:	18.1"	S	can Width:	11"	Ref. Le	vel Correc	tion (Trans.	s. Corr): <u>0</u> DB				
Procedure:	GEMA S	SVUT-INS	3-007.3	3	Rev. 2	Materia SS	I Type: ⊠ CS (OTHER:					
File Name / Item #:	,	ERT.WE	LD/PL	ATE 5		Transd	ucer:		EG D				
Xo Ref. Point (Lo): 1" be	low horiz	weld										
Yo Ref. Point (W	o): cente	er line of 2	24" rise	ır									
Sizing Meth	lod	Angle (de	eg)	Refere	nce Cal. S	heet		Set-Up	/ File Na	ame			
1 45° SHEAF													
2 60° SHEAF	2												
3 AATT													
4 DUAL 0°	1			INDICA	TION INF	ORMATIC)N						
Ind. Method	Weld					h Max. L1		L2	W1	Width	W2	Indication Type	
na. Method	Side	R. Lig.	Amp.	(in)	(in)	(in)	(in)	(in)	(in)	maicauon Type			
	1			+			1						
	-	-		-	+		.						
	+	-		+ -		-							
				+			-						
	1	1								<u> </u>			
Remarks:													
No crack lil			om I B	Eldor									
[N1] See A Examiner: W.	Commence of the Commence of th		miner:	. Lidei		Analyst: W	H. Nelson	, F	eviewer	r: J. B. Elder			
10 2	2.	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	or.		THE PART OF THE PA	INA)	- 1			Lidei			
Level: II Date	12/20/0	-6°	Date	e:		Level: III			N1] evel: III	Date:			
P-Scan Limite	2KG III CHA		Dall			Love: <u>III</u> 1	Date03/	<u> </u>					
COGEMA-SVUT-INS	-007.3. Rev.	2. Attachment 5	5					THE TOTAL PROPERTY.		Rev. Dec. 03, 200			

AUTOMA		RASONIC REPORT		SS		Job # 04	1-41	Riser #		
Location: 200 EA	ST TANK	FARM				am Start: 12/15/04	0936	Exam End:	1952	
Component ID: 1	02-AP				Exa	amination Surfac	ce:	Nominal Thickness:	.937"	
Configuration:	PLA	TE TO KI	NUCKLE		Calibrated Range: 0.3" TO 1.0" Temp: AMB OF					
Total Length Examin	ned: 84.6	" Sc	an Width:	11"	Ref. Level Correction (Trans. Corr.):					
Procedure: COG		T-INS-007.3	Re	2		terial Type:	THER:	Cond		
File Name:	HORIZ.	WELD / KN	UCKLE		Tra	ansducer:		G □ ANGLE	0	
Xo Ref. Point (Lo):		1 st air slot r		ıth air I	TALL DE	A DUAL 130	SC MODE	ANGLE		
Yo Ref. Point (Wo):										
Part # / Indication	X Start	X Stop	Y Start	YS		Ave. Thk.	Min. Thk.,	Area Reportable	Max. Thk.	
0-12	(in)	(in)	(in)	(ir		(in) .940*	R. Lig. (in)	Reportable	(in) .960"	
12-24						.940"	.916"		.960"	
24-36						.940	.878"		.960"	
36-48						.940"	.905"		.960"	
48-60						.940"	.915"		.960"	
60-72						.940"	.910"		.960"	
72-84										
84-84.6										
								1		
								1		
Remarks: No data @ 72 Knuckle side	only									
[N1] See Atta		r From J. B. Examiner:	Elder	10	nalvet	: W. H. Nelson	Tpo	viewer: J. B. E	Elder	
WHX		Chamiller.				12 Dec	- 10			
Level: III Date: _		Date	:	Le	evel:	III Date: 02/2		vel: III Date:		
COGEMA-SVUT-INS-007	.3, Rev. 2, Attacl	ment 6		- 1				Re	ev. Dec. 03, 200	

AUTOMA		RASONIC REPORT		SS							
	ST TANK F	ARM				am Start: 12/15/04	0936	Exam End:	1952		
Component ID:	02-AP					amination Surfa ☑ OD ☐ ID [Nominal Thickness:	.875"		
Configuration:	PLAT	E TO K	NUCKLE		Calibrated Range: 0.3" TO 1.0" Temp: AMB OF						
Total Length Exami	ned: 84.6'	Sc	an Width:	11"	Ref. Level Correction (Trans. Corr.):						
Procedure: COC		T-INS-007.3	Re			terial Type:	THER:	Cond	A STATE OF S		
File Name:	HORIZ.	WELD / KNI	UCKLE			nsducer:	GL 🖾 0 DEG	G ANGLE	. •		
Xo Ref. Point (Lo):		1 st air slot r		th air li	THE STATE	A BOAL G	SC MODE	3 ANOLL			
Yo Ref. Point (Wo):	Center line	e of weld									
Part # / Indication	X Start	X Stop (in)	Y Start (in)	YSt		Ave. Thk.	Min. Thk., R. Lig. (in)	Area Reportable	Max. Thk.		
0-12	(in)	(11)	(0)	(in	,	(in) .860*	.853"	Reportable	(in) .870"		
12-24						.860"	.819"		.870"		
24-36						.860"	.827"		.870"		
36-48						.860"	.845"		.870"		
48-60						.860"	.854"		.870*		
60-72						.860"	.805"		.870*		
72-84						.860"	.860"		.870"		
84-84.6						.860"	.860"		.870*		
				1							
							<u> </u>		 _		
Remarks: Plate side on											
[N1] See Atta		the latest the second second second second	Elder					deven LC	- Idoa		
Examiner: W. H.	27193020 220 4	Examiner:		THE RESERVE	A	W. H. Nelson		viewer: J. B. I	=ider		
Level: III Date:	12/15/04	Date	:	Le	Level: III Date: 02/28/05 Level: III Date:						
COGEMA-SVUT-INS-00	73 Rev 2 Attach	ment 6						R	ev. Dec. 03, 200		

	ULTRASONIC P-SCAN TA REPORT					4-41	30			
Location: 200 EAST TANK	FARM	System:	PSP-4	Exam S	tart: 2/15/04	1021	Exan	n End:	2002	
Component ID: 102-AP				Examina	ation Surfa		Exam End: 2002 Nominal Thickness: 0.937 Temp: AMB Corr): 0 DB Condition: N/A			
Configuration: PL	ATE TO	KNUCKL	E	Calibrat Range:	ed	0" то 3.75'		THE PARTY OF THE P	AMB °F	
Total Length Examined: 82	2.2"	Scan Width	10.4"			tion (Trans.	Corr):			
Procedure:		7.0	Rev.	Materia					dition:	
COGEMA SV			2	Transdo	⊠ CS C	OTHER:		1		
/ Item #: HORI	Z. WELD /	KNUCKLE		DU		GL 00	EG D	ANGL!	: <u>60</u> °	
Xo Ref. Point (Lo): Started	@ 1st air st	ot north of	south air	line						
Yo Ref. Point (Wo): Center	line of weld									
Sizing Method	Angle (deg)	Refere	ence Cal. Si	neet		Set-Up	/ File Na	ame		
1 45° SHEAR										
2 60° SHEAR										
3 AATT										
4 DUAL 0°										
	Depth Ma	COMPANY NAMED IN COLUMN	TION INF	L2	N W1	Width	1410			
	Depth Ma R. Lig. Am		Length (in)	(in)	(in)	(in)		Indic	ation Type	
										
+										
							-			
Remarks:				٠	l	LL				
No crack like indication		D Elda-								
[N1] See Attached Le Examiner: W. H. Nelson	Examiner	THE RESERVE AND DESCRIPTION OF THE PERSON NAMED IN COLUMN TWO	A	nalyst: W.	H. Nelson	n R	eviewer	: J. B. I	Elder	
WEDEL				WH			N1]			
Level: III Date: 12/15/04	_	Date:	_	.evel: <u>III</u> C	oate: _02/2	28/05 Le	evel: <u> </u>	_ Date:		
COGEMA-SVUT-INS-007.3, Rev. 2, A	Attachment 5							Re	v. Dec. 03, 20	

AUTOMA	TED ULT DATA	RASONIC REPOR		IESS		Job#	1-41	30 .		
Location: 200 EA	ST TANK F	ARM			Exa	m Start: 12/20/04	0919	Exam End:	2304	
Component ID:	102-AP					mination Surfa		Nominal Thickness:	.875"	
Configuration:	PLAT	E TO H	NUCKLE			brated	.3" то 1.0"		AMB ^O F	
Total Length Exami	ned: 120"	S	ican Width:	9.7"	Ref. Level Correction (Trans. Corr.):					
Procedure: COG	SEMA SVU	Γ-INS-007.	3	Rev 2		erial Type: SS 🖾 CS O	THER:		ition: N/A	
File Name:	HORIZ.V	/ELD / KN	UCKLE A		Tra	nsducer:		G □ ANGLE	0	
Xo Ref. Point (Lo):	Started @	1 st vert we	eld south of	24"rise	FUH BRITT					
Yo Ref. Point (Wo):										
Part # / Indication	X Start (in)	X Stop (in)	Y Start (in)	Y Si		Ave. Thk. (in)	Min. Thk., R. Lig. (in)	THE REPORT OF THE PARTY OF THE	Max. Thk. (in)	
0-12						.870*	.859"		.890"	
12-24						.865*	.858"		.885*	
24-36						.865*	.858"		.885*	
36-48						.865"	.859"		.885"	
48-60						.865"	.825*		.885"	
60-72						.865"	.829"		.885"	
72-84						.870"	.861"		.895"	
84-96						.870"	.861"		.895"	
96-108						.870"	.844"		.895"	
108-120						.870"	.859"	,	.895"	
Remarks: Plate side on [N1] See Atta Examiner: W. H. WANTE Control Level: III Date:	ached Lette Nelson	Examiner:	3. Elder	_ -	W	W. H. Nelson 71el 11 Date: 02/2	u	eviewer: J.B. N1] evel: <u>III</u> Date:		

COGEMA-SVUT-INS-007.3, Rev. 2, Attachment 6

Rev. Dec. 03, 2003

AUTOMA		TRASONIC A REPORT	TO THE RESIDENCE OF THE PARTY OF THE	SS	Job# 04-41			Riser # 30		
	ST TANK	FARM			Exa	am Start: 12/20/04	0919	Exam End:	2304	
Component ID:	102-AP				Ex	amination Surfa ☑ OD ☐ ID [Nominal Thickness:	.937"	
Configuration:	PLA'	TE TO K	NUCKLE			librated	.3" то 1.0	Toma	AMB °F	
Total Length Exami		1 80	an Width:	9.7"		f. Level Correct		corr).	O DB	
Procedure: COC		T-INS-007.3	I Re			aterial Type:	THER:	Cond		
File Name:	HORIZ	WELD / KNU	ICKLE A		Tra	ansducer:		o Dange	0	
Xo Ref. Point (Lo):	Started @) 1 st vert wel		24" rise		⊠ DUAL □ SO	GL 🖾 0 DE	EG □ ANGLE		
Yo Ref. Point (Wo):	Center lin	e of weld								
Part # / Indication	X Start (in)	X Stop (in)	Y Start (in)	Y St		Ave. Thk.	Min. Thk., R. Lig. (in		Max. Thk. (in)	
0-12						.970*	.947"		.980"	
12-24						.970*	.943"		.980"	
24-36						.970"	.929"		.980"	
36-48						.970"	.941"		.980"	
48-60						.975"	.955"		.980"	
60-72						.975*	.951"		.985"	
72-84						.980"	.959"		.985"	
84-96						.980"	.953"		.985"	
96-108						.985"	969*		.990"	
108-120						.980"	.911"		.990"	
Remarks: Knuckle side		or From I. B.	Elder							
[N1] See Atta Examiner: W. H.		Examiner:	Elder			W. H. Nelson		eviewer: J. B. (Elder	
Level: III Date: Date:					Level: III Date: 02/28/05 Level: III Date:					
COGEMA-SVUT-INS-007	7.3. Rev. 2. Attac	hment 6			-1-11			R	ev. Dec. 03, 2003	

0
2310
0.9375"
AMB.°F
O DB
dition:
E: 60°
E. <u>00</u>
cation Type
Elder

AUTOMA	AUTOMATED ULTRASONIC THICKNESS DATA REPORT						1-41	Riser #		
Location: 200 EA	ST TANK F				Exa	am Start: 12/20/04	0924	Exam End:	2347	
Component ID:	02-AP					amination Surfac	ce:	Nominal Thickness:	.875"	
Configuration:	PLAT	E TO K	NUCKLE		Ca	librated	3" то 1.0"	Tomat	AMB ^o F	
Total Length Exami	ned: 57.6	, Sc	an Width:	9.4"		f. Level Correcti	on (Trans. C	orr.):	0 DB	
Procedure: COG	SEMA SVU	T-INS-007.3	Re	ev 2		aterial Type:	HER:	Cond	ition: N/A	
File Name:	HORIZ.V	VELD / KNU	CKLE B			ansducer: ☑ DUAL ☐ SG	SL 🖾 0 DE	G □ ANGLE	. •	
Xo Ref. Point (Lo):		vert. weld e				are de		<u> </u>		
Yo Ref. Point (Wo):	AND DESCRIPTION OF THE PARTY OF									
Part # / Indication	X Start	X Stop	Y Start	YS		Ave. Thk.	Min. Thk.,		Max. Thk.	
0-12	(in)	(in)	(in)	(in	1)	(in) .870"	R. Lig. (in) .830"	Reportable	(in) .890"	
12-24						.870"	.806"		.890"	
24-36						.870*	.849"		.885"	
36-48						.865"	.829"		.880"	
48-57.6						.865"	.847"		.880"	
						-				
						 				
						+		1		
						1				
Remarks: Plate side on		r From I B	Elder			- Lo				
Examiner: W. H.	THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED I	Examiner:	Lidei			t: W. H. Nelson	Re	eviewer: J. B. I	Elder	
win				_ 1	W	Wile	1	N1]		
Level: III Date:	12/20/04	Date	:	Le	evel:	III Date: 02/2	8/05 Le	evel: <u>III</u> Date:		
COGEMA-SVUT-INS-00	7.3. Rev. 2. Attach	ment 6		1				R	ev. Dec. 03, 200	

AUTOMA		RASONIC REPORT		SS		Job# 04	4-41	Riser #		
Location: 200 EA	ST TANK F	ARM			Exa	am Start: 12/20/04	0919	Exam End:	2304	
Component ID:	102-AP					amination Surfa	ce:	Nominal Thickness:	.937"	
Configuration:	PLAT	E TO KI	NUCKLE		Calibrated Range: 0.3" TO 1.0" Temp: AMB OF					
Total Length Exami	ned: 57.6	, So	an Width:	9.3"		f. Level Correct	ion (Trans. C	orr.):	0 DB	
Procedure:	SEMA SVU	T-INS-007.3	Re	2		terial Type:	THER:	Cond	ition: N/A	
File Name:	HORIZ.V	VELD / KNU	ICKLE B		Tra	ansducer:		G ANGLE	0	
Xo Ref. Point (Lo):	Started @	vert. weld,	end of knud	kle A		A DOVE	24000	о Циносс		
Yo Ref. Point (Wo):										
Part # / Indication	X Start	X Stop (in)	Y Start (in)	Y St		Ave. Thk.	Min. Thk.,	Area Reportable	Max. Thk.	
0-12	(in)	(117)	(11)	, (III)	,	(in) .930"	R. Lig. (in) .901"	Reportable	.945"	
12-24						.930"	.886*		.945*	
24-36						.935"	.910"		.945"	
36-48						.935"	.918"		.945*	
48-57.6						.935"	.912"		.945"	
							•			
						+		-	×	
								+		
Remarks: Knuckle side	only									
[N1] See Atta Examiner: W. H.	Nelson	r From J. B. Examiner:	Elder	200	100	t: W. H. Nelson		viewer: J. B. I	Elder	
					- While MI					
Level: III Date: 12/20/04 Date:					Level: <u>III</u> Date: <u>02/28/05</u> Level: <u>III</u> Date:					
COGEMA-SVUT-INS-00	7.3 Rev 2 Attach	ment 6						R	ev. Dec. 03, 200	

	AUTO		D ULTRA ATA REF	AND THE PERSON NAMED IN COLUMN	-SCAN		Jo	ob# C	4-41	Riser#				
Locat		AST TAN	NK FARM	Systen	n: PSP-	4	Exam S	Start: 12/20/04	0929	Exar	n End: 2310			
Comp	oonent ID:	102-AP						nation Surf	ace:	Exam End: 29 2310 Nominal Thickness: 0.9378 3.75" Temp: AMB Condition: N/A Condition: N/A				
Confi	guration:	- 1	PLATE TO	KNUC	KLE		Calibra Range:	ited	0" то 3.75					
Total	Length Exar	nined:	55.2"	Scan W	idth:	0.4"	Ref. Le	evel Correc	tion (Trans.	Corr):	<u>0</u> DB			
Proce	edure: CO	GEMA S	SVUT-INS-	007.3	Rev	2		al Type: ⊠ CS (OTHER:					
/ Item			RIZ. WELD	/ KNUCKI	E B		Transd		GL □0	EG [⊠ ANGLE: 60°			
X _o R	ef. Point (L _o)	Starte	ed @ end o	of knuckle	Α									
Y _o R	ef. Point (Wo): Cente	er line of w	eld										
	Sizing Metho	10011	Angle (deg) Re	ference C	Cal. She	et		Set-Up	/ File N	ame			
1_	45° SHEAR													
2	60° SHEAR													
3	DUAL 0°						\rightarrow							
•	DOALO			IND	CATION	INFO	RMATIC	N						
Ind.	Method Weld		Depth	Max.	_1 Le	ength	L2	W1	Width		Indication Type			
-	- Incured	Side	R. Lig.	Amp. (in)	(in)	(in)	(in)	(in)	(in)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
+														
N	narks: lo crack lik N1] See At		tions _etter Fron	n J. B. Elde	er									
Exa	miner: W. H	I. Nelson	Exami	ACCRECATE AND PARTY OF THE PART		An		. H. Nelsor		Reviewer	: J. B. Elder			
Lev	el: III Date:	12/20/04	4_	Date:		Le	vel: <u>III</u> 1	Date: <u>02/</u> 2	28/05 L	.evel: <u> </u>	Date:			

COGEMA-SVUT-INS-007.3, Rev. 2, Attachment 5

Rev. Dec. 03, 2003

	AUTO		D ULTR ATA RE		IIC P-SC 「	AN	N Job# 04-41 Riser# 30					30			
Locat		AST TAN	IK FARM		System: P	SP-4	Exam S	tart: 1/03/05	1246	Exan	n End:	1952			
Comp	onent ID:	102-AP						ation Surf	ace: PAINTED	Nom Thick	0.9375"				
Confi	guration:	F	PLATE	то к	NUCKLE		Calibrat Range:		0" то 2.65	,"	Temp:	AMB °F			
Total	Length Exar	mined:	120"	S	can Width:	5.7"	Ref. Le	vel Correc	ction (Trans.	Corr):) DB			
Proce	edure:	GEMA S	SVUT-INS	3-007.3		Rev.	Materia	Type:	OTHER:		Cond	lition: N/A			
File N	lame				TE / KNU		Transdi	ucer:			Z ANGLE	0			
/ Item Xo R	ef. Point (Lo)				north of s		DU	AL 🗆 S	SGL 00	EG E	⊠ ANGLE	: 45			
Y _o R	ef. Point (Wo).	r line of		norar or s	odur all									
	Sizing Meth		Angle (de		Referen	nce Cal. Sh	eet		Set-Up	/ File Na	ame				
1	45° SHEAR														
2	60° SHEAR														
3	AATT														
4	DUAL 0°				INDICAT	ION INFO	RMATIO	N							
Ind.	Method Weld		Depth Ma R. Lig. Am		L1	Length	L2	W1	Width	W2	I Indi	ation Type			
-		Side	R. Lig.	Amp.	(in)	(in)	(in)	(in)	(in)	(in)					
-									-						
-				-											
\dashv		-			+	ļ			-						
-		-							1						
						 									
						-			1		-				
					4		ļ				-				
											1				
Rer	narks:														
					- 11										
	M1] See At			m J. B	. Elder	ΙΔ:	nalyst: W.	H Nelson	1 6	leviewer	- JRF	Ider			
	1	Lind		miei,		_ 2	W.D	Der		N1]	. J. D. I	-idei			
Lev	el: II Date:		7	Date	ə:	_ Le	evel: <u>III</u> C	Date: <u>02/</u>	11 11 11 11 11 11 11 11 11 11 11 11 11		Date:	3/1/05			
P	-Scan Limite	d													

AUT		D ULTR			CAN	Jo	ob# ()4-41	Rise	r# 3	0
Location: 200 E	AST TAI	NK FARM		System:	SP-4	Exam (Start: 01/03/05	1246	Exar	n End:	1952
Component ID:	102-AF	,					nation Surf	ace:	Nom	inal kness:	0.9375"
Configuration:		PLATE	ro K	NUCKLE		Calibra	ited	0" то 2.6		Temp:	AMB ^o F
Total Length Exa	mined:	120"	S	can Width:	5.7"	Ref. Le	evel Correc	ction (Trans	. Corr):		0 DB
Procedure:	GEMA 9	SVUT-INS	007	<u>, T</u>	Rev. 2		al Type:	OTHER:			dition:
File Name						Transo	CS Colucer:	JINER:		.L	N/A
/ Item #: HC Xo Ref. Point (Lo		ELD / 45 /	PLAT	E / KNU	CKLE A		JAL 🛛	SGL 0	DEG [ANGL	E: 45°
	Starte	ed @ end	of pla	te/ knuck	le						
Yo Ref. Point (W	o): Cente	er line of v	veld								
Sizing Meth	CONTRACTOR OF STREET	Angle (de	g)	Referen	nce Cal. Sh	eet		Set-Up	/ File Na	ame	
1 45° SHEAF											
2 60° SHEAF	1					++					
4 DUAL 0°			\dashv			-+					
				INDICAT	TION INFO	RMATIC	ON				
Ind. Method	Weld Side	Depth R. Lig.	Max. Amp.	L1 (in)	Length (in)	L2 (in)	W1 (in)	Width (in)	W2 (in)	Indi	cation Type
				-							
										-	
	.									-	
Remarks:											
NO CA			CHDS	CA750	05 3/2 05 3/2	los					
Examiner: W		Exam		. LIUCI	Ar	alyst: W.	H. Nelson		Reviewer	J. B. I	Elder
Level: II Date		<u>g</u>	Date	:	Le	vel: <u> </u> [Date: <u>02/2</u>		N1] .evel: <u>III</u>	Date:	
COGEMA-SVUT-INS		Attachment 5								Re	v. Dec. 03, 200

ocation: 2 Procedure:		CALIBRA	TION SH		CKNE	SS	Job		04-41	rus	er#	27
	00 EAS	T TANK FA	RM	System	102-	AP	Calibrati Block		4-99-30-	004		
		EMA SVUT-		3	Rev	-	Thickne	ec.	' to 1.0"	Material	Cart	on Steel
JT System:	٠ ١	PSP-4	Serial No) .	206/20	19	Referen Block			N/A		
Software V	ersion:	P-SCAN	Sve 4 1	3	Rev.	2	Thickne	ss:	N/A	Materia		N/A
inearity Du	ue Date:	11/30/					Referen	ce Block	Tama:	AMB ^O F		IWA
Scanner Ty	vpe:		Serial No	0.			Couplar	nt:		Batch N		
		AWS-5d		309	9		A		ater			N/A
Scanner Ca	able:	COAXIAL					Cable L	ength:	80	Feet		
Signal Cab	le:	COAXIAL					Cable L	ength:	80	Feet		
Channel	THE RESERVE	nsducer	Model		Freq.		Size	Ser	ial No.	Angle	T	Wedge
1		Make KB	MSEB		(MHz)	9	2MM		1933	(deg)	+-	Туре
2		KB	NISEB			- 07	ZIVIIVI	- 0	1933		+-	
3	+					+ -		_				
4						1		+			1	
	L CALIB	RATION				CA	LIBRA	TION CH	HECKS			
DATE:		11/18/04	11/18/04	11/	22/04	11/22/0		1/23/04	11/23/0	4 11/	30/04	11/30/04
TIME:		0902	1541	10	917	1923		1030	1540		941	2040
REFLECT	TOR:	.3"-1.0"	.3"-1.0"	.3	"-1.0"	.3"-1.0	• :	3"-1.0"	.3"-1.0	3'	-1.0"	.3"-1.0"
TI T	HK. 1	.302"	.299"	:	299"	.289"		.301"	.295"	- 3	301"	.292"
CH. 1	HK. 2	1.00"/0db	.997"/0db	1.0	0"/0db	.994"/20	db 1.	db0\"00.	.995"/0	db 1.0	0"/0db	.991"/2db
CH. 2 T	HK. 1	.299"	.295"		299"	.292"		.299"	.292"		301"	.295*
CH. Z	HK. 2	1.00"/0db	.994*/0db	1.0	0"/0db	.991"/1	db 1.	.00"/0db	.995"/2	db 1.0	0"/0db	.997"/0db
CH. 3	HK. 1	.299"	.295*		299"	.292"		.299*	.292"		299"	.289"
т. Т	HK. 2	1.00*/0db	.994"/0db	1.0	0°/0db	.991"/1	db 1.	.00"/0db	.999"/1	db 1.0	07/0db	.994*/2db
CH. 4 T	THK. 1											
т т	HK. 2											
EXAMIN	ER:	WDP	WDP	1	NDP	WDP		WDP	WDF	' '	VDP	WDP

,	AUTOMA	CALIBRA				SS	Job#		04-41	Rise		27
ocation	200 FAS	ST TANK FA	RM	Syste	m: 102-	AP C	Calibration Block:	44	4-99-30-	004		
Procedu	re.	EMA SVUT-		7.3	Rev.		Thickness:		" to 1.0"	Material:	Carb	on Steel
JT Syst	em:	PSP-4	Serial I	No.	206	1	Reference Block:			N/A		
Software	e Version:	P-SCAN	Svs 4 1	13	Rev.	2	Thickness:		N/A	Material:		N/A
Linearity	y Due Date:	03/08/			-		Reference		. T	AMB ^O F		
Scanne	r Type:		Serial I	No. 30	<u> </u>		Couplant:			Batch No		N/A
Scanne	r Cable:	AWS-5d		30)9		Cable Leng		Vater	L		N/A
0:16		COAXIAL					o-11-1		80	Feet		
Signal C	Jable:	COAXIAL					Cable Leng	gun:	80	Feet		
Chann	el Tra	ansducer Make	Mode	el	Freq. (MHz)		Size	Se	rial No.	Angle (deg)		Wedge Type
1		КВ	MSE	В	5		2MM	0	1933	0		
2												
3												
4												
INIT	TIAL CALIE	RATION				CAI	LIBRATIC	NC	HECKS			
DATE:		12/09/04	12/09/0	4 1	2/13/04	12/13/04	12/14	4/04	12/14/0	12/1	5/04	12/15/04
TIME:		0929	1508		0909	1948	083	20	1454	09	36	1952
REFLE	ECTOR:	.3"-1.0"	.3"-1.0		3"-1.0"	.3"-1.0"	.3"-1	1.0"	.3"-1.0	.3"-	1.0"	.3"-1.0"
CH. 1	THK. 1	.302"	.299*		.302"	.302"	.30	2"	.299"	.30)2"	.299*
011.1	THK. 2	1.00"/0db	.994"/-10	db 1	.00"/0db	1.00"/0d	ь 1.00	'/Odb	.994"/2	db 1.00	'/0db	.997"/0db
CH. 2	THK. 1	.302"	.299"		.299"	.299"	.29	9"	.295"	.30)2"	.299*
J	THK. 2	1.00"/0db	.997"/-10	db 1	.00"/0db	1.00"/0d	b 1.00°	70db	.997"/2	db 1.00	"/0db	.997"/0db
CH. 3	THK. 1	.299"	.295"		299"	.299*	.29	99"	.295*	.30	02"	.295*
	THK. 2	1.00"/0db	.997"/-10	db 1	.00°/0db	1.00"/0d	b 1.00°	'/0db	.997"/2	db 1.00	"/Odb	.997"/0db
CH. 4	THK. 1											
	THK. 2											
	IINER:	WHN	WHN		WHN	WHN	W	HN	WHN	ı w	HN	WHN
Rema	irks: L T1/Vert.	wall										
	iner. W. H	H. Nelson		Exam	iner:					r. W. H. N	lelson	
Level	: <u>III</u> Da	te: 12/09-1	5/04	Level	D	ate:			Level: 1	II Date:	31	105
000514	A CLAIT INC OO	7.3, Rev. 2, Attachn	unt 1									ev. Dec. 03, 20

A		TED ULTR				SS	Job#		04-41		Riser #	27
Location	200 EAS	T TANK FA	RM	Sys	tem: 102-/	AP	Calibration Block:	44	4-99-30-	004		
Procedu	re: COG	EMA SVUT-	INS-007	7.3	Rev.	2	Thickness:	0.3	" to 1.0"	Mate	rial: Carb	on Steel
UT Syste	em:	PSP-4	Serial	No.	206/20	9	Reference Block:			N	I/A	
Software	e Version:	P-SCAN	Svs. 4	1.3	Rev.	2	Thickness:		N/A	Mate	rial:	N/A
Linearity	Due Date:	11/30/					Reference	Block	Temp:	AMB		
Scanner	Type:	AWS-5d	Serial	No. 3	309		Couplant:	W	/ater		h No.	N/A
Scanner	Cable:	COAXIAL					Cable Len			Fee	1	
Signal C	able:	COAXIAL					Cable Len	gth:) Fee		
Chann	61 I	nsducer Make	Mod	el	Freq. (MHz)		Size	Se	rial No.	Angi	127	Wedge Type
1		КВ	MSE	В	5	8)	2MM	0	1999	0		
2		КВ	MSE	В	5	83	2ММ	0	1930	0		
3												
4												
INIT	IAL CALIB	RATION				CA	LIBRATIC	ONC	HECKS			
DATE:		11/30/04	11/30/0	4	11/30/04	11/30/0	4 12/0	6/04	12/06/0)4	12/06/04	12/06/04
TIME:		1052	1058		2101	2106	10	22	1027		1922	1924
REFLE	ECTOR:	.3"-1.0"	.3"-1.0	-	.3"-1.0"	.3"-1.0	.3"-	1.0"	.3"-1.0)"	.3"-1.0"	.3"-1.0"
CH. 1	THK. 1	.299"	.299*		.299"	.299"	.29	99"	.301"		.295"	.298"
-	THK. 2	1.00"/0db	1.007/0	db	.996"/1db	.993"/00	ib 1.00	"/0db	1.00"/0	db	.9967/1db	.999"/0db
CH. 2	THK. 1	.299"	.299"		.298"	.295	.2	95	.301		.295"	.298"
	THK. 2	1.00"/0db	1.00"/0	db	.993"/0db	.993"/0	ib 1.00	*/0db	1.00"/0	db	.996"/0db	.999"/0db
CH. 3	THK. 1	.295"	.299*		.298"	.298*	.2	95"	.301	•	.295"	.298"
0,0	THK. 2	1.00"/0db	1.00*/0	db	.993"/1 db	.996"/0	tb 1.00	"/0db	1.00"/0	db	.996"/0db	.999"/0db
CH. 4	THK. 1											
011.4	THK. 2											
EXAM	IINER:	WDP	WDP		WDP	WDP	W	MN	WHN	1	WHN	WHN
	rks: L T2 Weld				miner: W. I	H. Nelson	n		Reviewe		H. Nelson	
Level:	: II Da can Limite		2		47 el: <u>III</u> D	ate:	12/06/04	-	Level: 1		Jel Date: 3/	1/25

,		TED ULTI CALIBRA				SS	Job#		04-41	F	Riser#	27
ocation	200 EAS	T TANK FA	RM	Syste	m: 102-/	AP C	alibration Block:	44	4-99-30	004		
Procedu	re:	EMA SVUT		7.3	Rev.		hickness:		" to 1.0"	Mater	^{ial:} Carb	on Steel
JT Syst	em:	PSP-4	Serial	No.	206/20	9 R	eference Block:			N	/A	
Software	e Version:	P-SCAN	Sve A	13	Rev.	2 T	hickness:		N/A	Mater	ial:	N/A
Linearity	Due Date:			1.0			eference	Madalin				IVA
Scanne	r Tyme:	03/08/	2005 Serial	No			ouplant:			AMB Batch		
		AWS-5d	Serial	30	09				Vater	Daton		N/A
Scanne	r Cable:	COAXIAL				C	able Leng	gth:	80	Feet		
Signal C	Cable:	COAXIAL				C	able Leng	gth:	80	Feet		
Chann	I I	nsducer Make	Mod	iel	Freq. (MHz)	Si	ize	Se	rial No.	Angle (deg)		Wedge Type
1		КВ	MSI	ΕB	5	8x2	MM	0	1999	0		
2		КВ	MSI	ЕΒ	5	8x2	MM	1	1930	0		
3		*KB	MSI	EB	5	8x2	MM	(1999	0		
4		*KB	MS	EB	5	8x2	MM	(2003	0		
רואו	TIAL CALIB	RATION				CAL	IBRATIC	ON C	HECKS			
DATE		12/15/04	12/15/0)4 1	2/15/04	12/15/04	12/2	0/04	12/20/0	04 1	2/20/04	12/20/04
TIME:		1033	1037		2007	2009	09	19	0924		2304	2307
REFLE	ECTOR:	.3"-1.0"	.3"-1.0)"	.3"-1.0"	.3"-1.0"	.3"-	1.0"	.3"-1.0)"	.3"-1.0"	.3"-1.0"
CH. 1	THK. 1	.303"	.303"		.299*	.303"	.30)2"	.302	•	.299"	.302"
011.1	THK. 2	1.00"/0db	1.00%	db .	996/1db	1.00"/1db	1.00	1/0db	1.00*/0	db .9	997"/2db	1.00"/0db
CH. 2	THK. 1	.303*	.299	<u>'</u>	.303*	.299*	.29	99"	.299	•	.295"	.302"
	THK. 2	1.00"/0db	1.00"/0		.00"/0db	1.00"/1db	1.00	7/0db	1.00%	db .s	997"/1db	1.00"/0db
CH. 3	THK. 1	.295"	.299	_	.292"	.299"		99"	.299	-	.295"	.302"
	THK. 2	1.00"/0db	1.00"/0	db 1	.00"/0db	1.007/1db	1.00	"/0db	1.00"/0	db .	997"/1db	1.00"/0db
CH. 4	THK. 1								-			
EYAL	THK. 2	VACUAL	10/14		WHN	NAMEN .	18"	LIN!	\\		MHM	VANJAN
THE RESIDENT AND ADDRESS OF THE PERSON NAMED IN	INER:	WHN	WHN	<u> </u>	WHN	WHN	l W	HN	WHI	<u> </u>	WHN	WHN
	L T3 Weld	ls ut Transduc	er #019	30								
Exam	iner: W. H	H. Nelson		Exam	iner:					r. W. H	H. Nelson	
Level	: III Da	te: 12/15&2	20/04	Level	: D	ate:			Level: _	II Da	ate: 3/	105
000511	4 01/11T INC 00	7.3, Rev. 2, Attachn										ev. Dec. 03, 200

A	UTOMA	TED ULTR				SS	Job#	04-41	Ris	er# 27
ocation	200 EAS	T TANK FA	RM	Syster	n: 102-	AP	Calibration Block:	444-99-30	-004	
Procedu	re:	EMA SVUT-		7.3	Rev.		Thickness:		Material	Carbon Steel
JT Syste	em:	PSP-4	Serial 1	No.	206/20	09	Reference Block:		N/A	
Software	e Version:	P-SCAN	Svs. 4 1	1.3	Rev.	2	Thickness	N/A	Material	N/A
inearity	Due Date:	03/08/2			1		Reference	Block Temp:	AMB °F	
Scanner	Туре:	AWS-5d	Serial I	No. 30	<u> </u>		Couplant:	Water	Batch N	
Scanner	Cable:	COAXIAL		- 30	3		Cable Len	ath:		IN/A
Signal C	Cable:						Cable Len	ath:	0 Feet	
		COAXIAL						8	0 Feet	
Chann		nsducer Make	Mode	el	Freq. (MHz)		Size	Serial No.	Angle (deg)	Wedge Type
1		КВ	MSE	В	5	83	2MM	01999	0	
2		КВ	MSE	В	5	83	2MM	02003	0	
3										
4										
	TAL CALIB							ON CHECKS		
DATE:		12/21/04	12/21/0		2/21/04	12/21/0	4			
TIME:	TOTOD	0848	0854		1456	1502				
KEPLE	THK. 1	.3"-1.0"	.3"-1.0"		.301"	.3"-1.0		-+-		
CH. 1	THK. 2	1.00"/0db	1.00"/00		96"/0db	1.00"/10				
	THK. 1	.298"	.301"	1.0	.301'	.301"				
CH. 2	THK. 2	1.00"/0db	1.00"/00	tb .9	96"/0db	.999"/0				
	THK. 1	.298"	.304"		.301"	.304"				
CH. 3	THK. 2	1.00"/0db	1.007/00	ib 1.	00"/0db	1.002"/0	db			
CH. 4	THK. 1									
OI 1. 4	THK. 2									
EXAM	IINER:	WDP	WDP		WDP	WDP				
Rema CAI				Exami	ner:			Review	er: W. H.	Nelson
Level:	IW	te: 12/21/	do:			Date:			WX	leh

	AUTOMA	CALIBRA				SS	l	Job #	04-41	Rise		27
Location	1: 200 EAS	ST TANK FA	RM	Systen	n: 102-/	AP	CARL TO LELLE	ration	444-99-30-	004		
Procedu	ıre:	EMA SVUT-		7.3	Rev.	2		ness.	.3" to 1.0"	Material:	Carl	oon Steel
UT Sys	tem:	PSP-4	Serial	No. 2	06/209/	405	THE STATE OF	rence ock:		N/A		
Softwar	e Version:	P-SCAN	Sys. 4	1.3	Rev.	2	Thick	(ness:	N/A	Material:		N/A
Linearit	y Due Date:	03/01/	2005				Refe	rence Blo	ock Temp:	AMB °F		
Scanne	r Type:	d AGS-2	Serial	No. 309	9/310/1	18	Coup	olant:	Water	Batch No.		N/A
Scanne	r Cable:	COAXIAL					Cable	e Length	80	Feet		
Signal (Cable:	COAXIAL					Cable	e Length	80	Feet		
Chanr	nel Tr	ansducer Make	Mod	lel	Freq. (MHz)		Size		Serial No.	Angle (deg)		Wedge Type
1		КВ	MSE	В	5	8	x2MN	A	01999	0		
2		КВ	MSE	В	5	8	x2MN	1	02003	0		
3		*KB	MSE	ЕВ	5	8	x2MN	۱ ۱	02003	0		
4												
רואו	TIAL CALIE	BRATION				CA	LIBR	ATION	CHECKS			
DATE		02/03/05	02/03/0	5 02/	/03/05	02/03/0	05	02/10/0	5 02/10/0	5 02/14	/05	02/14/05
TIME:		1234	1238	1	438	1438		1238	2000	083	8	1516
REFLE	ECTOR:	.3"-1.0"	.3"-1.0	.3	"-1.0"	.3"-1.0)"	.3"-1.0"	.3"-1.0	.3"-1	.0"	.3"-1.0"
CH. 1	THK. 1	.299"	.299"	- 2	299"	.295"		.302"	.302"	.30	2"	.299"
	THK. 2	1.00"/0db	1.00"/00	db 1.0	1"/-1db	.996"/0	db	1.00"/0d	b 1.01-2d	b 1.00%	0db	.997"/2db
CH. 2	THK. 1	.299"	.299"		295"	.295"	<u>' </u>	.302"	.302"	.30	2"	.299"
	THK. 2	1.00"/0db	1.00"/00	db .996	6"/-1db	.996"/0	db	1.00"/0d	b 1.01"/-2d	db 1.00"/	0db	.997"/2db
CH. 3	THK. 1	.299*	.299"	;	295"	.295"		302"	.302"	.29	9"	.295"
	THK. 2	1.00"/0db	1.00"/0	db .99	6"/-1db	.996"/0	db	1.00"/0d	b 1.01"/-20	db 1.00"	/Odb	.997"/2db
CH. 4	THK. 1											
	THK. 2						_					
	INER:	WHN	WHN	V	VHN	WHN	1	WHN	WHN	WH	IN	WHN
CAI	5	ducer used o	n 2/10	& 14/05								
Exami	iner: W. H	l. Nelson		Examin	er:				Reviewer	W. H. Ne	elson	
Level:	III Dat	te: 2/3,10,1	4/05	Level:	Da	ite:			Level: III	_ Date:	3/	1105
COGEMA	-SVUT-INS-007	.3, Rev. 2, Attachme	ent 1								Re	w. Dec. 03, 2003

Procedure UT Syste	200 EAS	T TANK FA	RM	System							
UT Syste	COG	EMA CVIIT			102-	AP	Calibration Block:	44	4-99-30-	004	
	m:	EIVIA SVUI-	INS-00	7.3	Rev.	2	Thickness:	0.3	to 1.0"	Material:	Carbon Steel
Software		PSP-4	Serial	No. 2	06/209/	405	Reference Block:			N/A	
	Version:	P-SCAN	Sys. 4	1.3	Rev.	2	Thickness:	ı	WA.	Material:	N/A
inearity	Due Date:	3/2005					Reference	Block	Temp:	AMB ^O F	
Scanner '	Туре:	AWS-5d	Serial	No. 309	9/310		Couplant:	w	ater	Batch No.	N/A
Scanner	Cable:	COAXIAL					Cable Leng	gth:	80	Feet	
Signal Ca	able:	COAXIAL					Cable Len	gth:		Feet	
Channe	el Tra	nsducer Make	Mod	lel	Freq.		Size	Ser	ial No.	Angle (deg)	Wedge Type
1	1	KB	MSE	В	5	8:	2MM	02	2001	0	Турс
2		КВ	MSE	В	5	8:	c2MM		2003	0	
3		*KB	MSE	В	5	8:	2MM	0	1988	0	
4											
INITI	AL CALIB	RATION				CA	LIBRATIC	N CH	IECKS		
DATE:		02/15/05	02/15/0	5 02	/15/05	02/15/0	5 02/0	1/05	02/01/0	5	
TIME:		0849	0834	1	530	1533	80	17	1506		
REFLE	CTOR:	.3"-1.0"	.3"-1.0	" .3	"-1.0"	.3"-1.0	.3"-	1.0"	.3"-1.0"		
CH. 1	THK. 1	.303"	.303"		303"	.303"	.30	2"	.299"		
	THK. 2	1.00"/0db	1.00*/00	ib 1.0	0"/0db	1.00"/00	ib 1.00°	'/Odb	.997*/0d	b	
CH. 2	THK. 1	.303"	.303"		299"	.303"	.30	2"	.299"		
CIT. Z	THK. 2	1.00"/0db	1.00"/00	db .99	7"/0db	1.00"/0	tb 1.00°	'/0db	.997"/00	Ь	
CH. 3	THK. 1	.303"	.303"		303"	.303"	.30)2"	.299*		
0,10	THK. 2	1.00"/0db	1.00"/0	db 1.0	0"/0db	1.00"/0	db 1.00°	'/0db	.997*/00	lb	
CH. 4	THK. 1										
	THK. 2										
EXAMI	NER:	WHN	WHN	1	WHN	WHN	W	hn	WHN		
	.6 ansducer	01988 used	on 2/1/							W II No	
LU#	ner: W. H	I. Nelson		LW-	er: W. F 4 7]	el-	0		W	W. H. No	L-
Level:	III Dat	e: 2/15/0)5	Level:	III Da	ite:	2/1/05		Level: <u>III</u>	_ Date:	311/05

COGEMA-SVUT-INS-007.3, Rev. 2, Attachment 1

Rev. Dec. 03, 2003

		ATED UL		THE DESIGNATION	-SCAN		Job#		04-41		Riser#	30
ocation	1: 200 EAS	T TANK FA	ARM	System	1: 102-A	AP (Calibration Block:	44	4-99-30	0-00	1/002	
Procedu	re: COGE	MA SVUT-I	NS-007.3	3	Rev.	2	Thickness:		1.0"	M	aterial:	Carbon Steel
UT Syst	tem:	SP-4	Serial N	lo.	209/20	6	Reference Block:				N/A	
Softwar	e Version:	P-SCAN	Sys. 4 1	.3	Rev.	2	Thickness		N/A	M	laterial:	N/A
Linearity	y Due Date:	11/30/				TREE CONCESSION	Reference	Block	Temp:	ΔΝ	ив ^о ғ	
Scanne	г Туре:	AWS-5d	Serial N	lo. 310	0		Couplant:	W	/ater		atch No.	N/A
Scanne	r Cable:	COAXIAL	1				Cable Len			30 F	oot	
Signal (Cable:						Cable Len	gth:				
	Trai	COAXIAL			Freq.	1		-		And	eet le (deg)	Wedge
Chann		Make	Mode	1	(MHz)	!	Size	Se	rial No.	Non	n. / Act.	Туре
1	4	KB	MWE		4	216 CT 11 CT	9mm		3242		45	
3		KB	MWE	3	4	82	9MM	- 0	3243		45	
4								+				
ПИІ	TIAL CALIBI	RATION				CA	LIBRATIO	ON C	HECKS			
DATE		11/18/04	11/18/04	11/	22/04	11/22/0	11/2	3/04	11/23	/04		
TIME:		0854	1547	0	906	1927	10	38	154	3		
	ECTOR / NTATION:	.050" Notch	.050" Notch	7	050" lotch	.050" Notch		50" otch	.056 Not	3100		
	AMPLITUDE	80%/0db	80%/2db	80	%/0db	80%/1d	b 80%	db0\c	80%/	1db		
CH. 1	LOCATION	1.414"	1.411"	1	.414"	1.414"	1.4	14"	1.40	1"		
CH. 2	AMPLITUDE	80%/0db	80%-1db	80	%/0db	80%/2d	b 80%	6/0db	80%/	1db		
OH. 2	LOCATION	1.414"	1.411"	1	.414"	1.411"	1.4	14"	1.41	1"		
CH. 3	AMPLITUDE											
	LOCATION											
CH. 4	AMPLITUDE											
	LOCATION							Watin .				
THE REPORT	MINER:	WDP	WDP	1	WDP	WDP	l w	IDP	W	P		
Rema CA	irks: L.P (vert.w	all)										
Exam	iner: WA	Purdy		Examin	er:				Review		N. H. Ne	Ison
Level P-S	: <u>II</u> Date		5	Level:	Da	ate:			Level:	111	Date:	31,105
COGEMA	A-SVUT-INS-007	3, Rev. 2, Attachn	nent 3							_		Rev. Dec. 03, 20

		ATED UL						Job#	,	04-41		Riser #		0
ocation	200 EAS	T TANK FA	ARM	System	m: 102-A	AP		bration lock:	44	4-99-30	0-00	1/002		
Procedu	re: COGE	MA SVUT-I	NS-007	.3	Rev.	2	-	kness:		1.0"	M	aterial:	Car	bon Steel
UT Syst	em: P	SP-4	Serial	No.	209/20	6	1 2 3 3 5 6 6	erence lock:				N/A		
Software	e Version:	P-SCAN	Sys. 4	1.3	Rev.	2		kness:		N/A	M	aterial:		N/A
Linearity	y Due Date:	03/08/	2005				Ref	erence	Block	Temp:	AN	1B OF		
Scanne	r Type:	AWS-5d	Serial	No. 31	0		Cou	ıplant:	N	/ater	В	atch No.		N/A
	r Cable:	COAXIAL					Cab	ole Leng	jth:	8	30 F	eet		
Signal C	Cable:	COAXIAL					Cat	ole Leng	gth:		30 F	eet		
Chann	ial la	nsducer Make	Mod	iel	Freq. (MHz)		Size		Se	rial No.	Angl	e (deg) n. / Act.		Wedge Type
1		КВ	MV	/B	4	1 8	x9m	m	0	3242		45		
2		КВ	MV	/B	4	8	3x9m	ım	0	3243		45		
3														
4	TIAL CALIBI	PATION				-	ALID	BATIO	N C	HECKS	_			
DATE		11/30/04	11/30/0	14 1	2/09/04	12/09/		12/13	(ALC: 14)	12/13	1/04	12/14	/04	12/14/04
TIME:		1110	2047		0948	1510	-	091		194		082		1500
	ECTOR /	.050"	.050"		.050"	.050		.05		.05		.050		.050"
	NTATION:	Notch	Notch	HERE STATES	Notch	Note	THE RESERVE OF THE PERSON OF T	Not	136 (4.6)	Not	70 C	Note		Notch
CH. 1	AMPLITUDE	80%/0db	80%/20	db 8	0%/0db	80%/1	db	80%/	/Odb	80%/	0db	80%/	0db	80%/0dbWD
O. 1. 1	LOCATION	1.414"	1.407	•	1.414"	1.397	7"	1.41	14"	1.40)1"	1.41	4"	1.407"
CH. 2	AMPLITUDE	80%/0db	80%/10	db 8	0%/0db	80%/0	db	80%	/Odb	80%	Odb	80%/	0db	80%/1db
	LOCATION	1.414"	1.407	-	1.414"	1.404	4"	1.4	14"	1.42	27*	1.41	4"	1.418"
CH. 3	AMPLITUDE													_
	LOCATION													1
CH. 4	AMPLITUDE									1				
	LOCATION									 				
	MINER:	WDP	WDF	<u>' </u>	WHN	WH	N	W	HN	W	IN	W	IN	WHN
Rema CA	arks: L-1 Vert. V	/all												
Exam	iner: WD	Purdy	ı l	Exami	ner: W. I	H. Nelse	on					V. H. N		n
Level P-S	: <u>II</u> Date		Way -	Level:	<u>III</u> Da	ate: 1	2/09	-14/04		Level:	_111_	Date:	3	1.105
COGEMA	A-SVUT-INS-007.	3, Rev. 2, Attachr	nent 3										-	Rev. Dec. 03, 2003

		ATED UL			-SCAN	l	Job #		4-41		Riser #	3	0
ocation:	200 EAS	T TANK FA	ARM.	System	102-	AP	Calibration	44	1-99-30	0-001	/002		
Procedure	a:	MA SVUT-I		3	Rev	2	Thickness		1.0"		terial:	Cart	oon Steel
JT Syster	m: P	SP-4	Serial I	No.	209/20	6	Reference Block:				N/A		
Software	Version:	P-SCAN	Sys. 4 1	1.3	Rev.	2	Thickness	. 1	N/A	Ma	aterial:		N/A
inearity l	Due Date:	03/08/					Reference		Chill Haller	AM	B °F		
Scanner '	Туре:	AWS-5d	Serial I	No. 310	0		Couplant	w	ater		tch No.		N/A
Scanner	Cable:	COAXIAL					Cable Le	ngth:	8	O Fe	eet		
Signal Ca	able:	COAXIAL					Cable Le	ngth:		0 Fe			
Channe		nsducer	Mode	el	Freq.		Size	Ser	ial No.	Angle	e (deg)		Wedge
1		Make KB	MW	B	(MHz)	-	x9mm	+	3094		. / Act.		Туре
2		KB	MW		4		x9mm		3198		50		
3													
4													
	AL CALIBR						LIBRATI	200 C D C C C C C C C C C C C C C C C C C	IECKS				
DATE:		11/30/04	11/30/04	4 12	/06/04	12/06/0	14 12/	15/04	12/15	/04	12/20	/04	12/20/04
TIME:		1113	2056	1	011	1916	11	021	200	2	092	9	2310
REFLE ORIEN	CTOR / TATION:	.050" Notch	.050" Notch	100	050" lotch	.050" Notch	100	50° otch	.050 Note		.050 Note		.050" Notch
CH. 1	AMPLITUDE	80%/0db	80%/1d	ь 80	%/0db	80%/2	tb 80%	%/0db	80%/	2db	80%/0	Odb	80%/2db
	LOCATION	2.000"	1.976"	2	.000*	1.948	* 2.	000"	1.98	5"	2.00	0"	1.966"
CH. 2	AMPLITUDE	80%/0db	80%/1d	b 80	%/0db	80%/0	db 80%	%/0db	80%/-	1db	80%/	Odb	80%/-1dt
	LOCATION	2.000"	1.990"	2	.000"	1.999	* 2.	000"	2.28	8"	2.00	0"	2018"
CH. 3	AMPLITUDE												
	LOCATION												
	AMPLITUDE												
CH. 4 -	LOCATION												
CH. 4	The second secon	WDP	WDP		WHN	WHN		VHN	WH		WH		WHN

COGEMA-SVUT-INS-007.3, Rev. 2, Attachment 3

Rev. Dec. 03, 2003

		IATED UL CALIBRA				ı	Job#	04-	41	Riser #	30
Location	200 EAS	T TANK FA	ARM	Syster	n: 102-/	AP	Calibration Block:	444-9	9-30-	001/002	
Procedu	ire:	MA SVUT-I		.3	Rev.	2	Thickness:	1.0		Material: (Carbon Steel
UT Syst	tem: F	PSP-4	Serial I	No.	209/20	6	Reference Block:			N/A	
Softwar	e Version:	P-SCAN	Sys. 4	1.3	Rev.	2	Thickness:	N/A		Material:	N/A
Linearit	y Due Date:	03/08/	2005		1		Reference	Block Ten	np:	AMB °F	
Scanne	r Type:	AWS-5d	Serial	No. 31	0		Couplant:	Wate		Batch No.	N/A
Scanne	er Cable:	COAXIAL					Cable Len	gth:	80	Feet	
Signal (Cable:	COAXIAL					Cable Len	gth:		Feet	
Chann	ו ומר	nsducer Make	Mod	el	Freq. (MHz)		Size	Serial N	10 1	Angle (deg)	Wedge Type
1		КВ	MW	В	4	8:	c9mm	0324		45	
2		KB	MW	В	4	8	k9mm	0324	3	45	
3		*KB	MW	В	4	8	х9ММ	0324	7	45	
4											
INI	TIAL CALIB	RATION				CA	LIBRATIC	N CHEC	KS		
DATE:		12/15/04	12/15/0	4 02	/01/05	02/01/0	5				
TIME:		0931	1955		0824	1501					
REFLE	ECTOR /	.050*	.050"		.050"	.050"					
ORIEN	NTATION:	Notch	Notch	1	Notch	Notch					
CH. 1	AMPLITUDE	80%/0db	80%/2d	b 80	%/0db	80%/20	Ь				
	LOCATION	1.414"	1.421"	1	.414"	1.397					
CH. 2	AMPLITUDE	80%/0db	80%/0d		%/0db	80%/10					
	LOCATION	1.414"	1.418"	1	.414"	1.397	<u> </u>				
CH. 3	AMPLITUDE										
	LOCATION			_							
CH. 4	AMPLITUDE						_				
	LOCATION										
	IINER:	WHN	WHN		WHN	WHN					
	L.P2 Vert \	Wall 03247 used	with 03	242 On	2/1/05						
Exam	iner: W. H	. Nelson	. 1	Examir	ner: W. h	I. Nelso	n	Rev	riewer	: W. H. Nel	son
U	1477	el_		111	4%	Tel-		1	UL	Me	_
Level	~~~	e: 12/15/	04	Level:		ite:	2/1/05	Lev	el: <u>II</u>	Date:	3/1/05
000514	SUMMER AND AND	3, Rev. 2, Attachm									Rev. Dec. 03, 20

RPP-RPT-23573, Rev. 0

	AUTOM	ONIC SHEET		Job # Riser # 30							
ocation	200 EAS	T TANK F	ARM	Syste	m: 102-AP		ration ock:	444-99-3	0-001	/002	
Procedu	COGE	MA SVUT-	INS-007.3		Rev. 2	Thick	Thickness:		Ma	aterial:	Carbon Steel
UT Syst	em: P	SP-4	Serial	No.	209/206	HILD HILDS AND	rence			N/A	
Softwar	e Version:	P-SCAN	Sys. 4	1.3	Rev. 2	Thick	(ness:	N/A	Material:		N/A
Linearity	y Due Date:	03/08/	/2005			Refe	Reference Block Temp: AMB ^O F				
Scanne	г Туре:	AWS-5d	Serial	No.	10	Coup	olant:	Water		atch No.	N/A
Scanne	r Cable:	COAXIAL				Cabl	e Lengt	h:	80 Fe	eet	
Signal C	Cable:	COAXIAL				Cabl	e Lengt	h.	80 Fe		
Chann	101	nsducer	Mod	lel	Freq.	Size		Serial No.	Angle	e (deg)	Wedge
1		Make			(MHz)					. / Act.	Туре
2		KB KB	MV		4	8x9mr 8x9mr		03094 03198		60 60	
3						<u> </u>		00100	1	· ·	
4											
INIT	TIAL CALIB	RATION				CALIBR	OITAS	N CHECKS			
DATE		12/21/04	12/21/04								
TIME:		0905	1507								
	ECTOR / NTATION:	.050" Notch	.050" Notch								
CH. 1	AMPLITUDE	80%/0db	80%/20	db							
Ch. I	LOCATION	2.000"	1.985	•							
CH. 2	AMPLITUDE	80%/0db	80%/20	db							
011.2	LOCATION	2.000"	1.981	•							
CH. 3	AMPLITUDE										
011.0	LOCATION										
CH. 4	AMPLITUDE										
	LOCATION										
EXAMINER: WDP		WDF	,								
Rema CA	rks: L.P4 Weld:	S									
Exam	iner: W.D	Surdy 1		Exam	iner:			Review	ver: V	V. H. Ne	elson
Level P-S	: <u>II</u> Date		B	Level	: Date	:		Level:	111	Date:	31,105
COGEMA	A-SVUT-INS-007.	3, Rev. 2, Attachr	ment 3								Rev. Dec. 03, 20

Att. 2-57

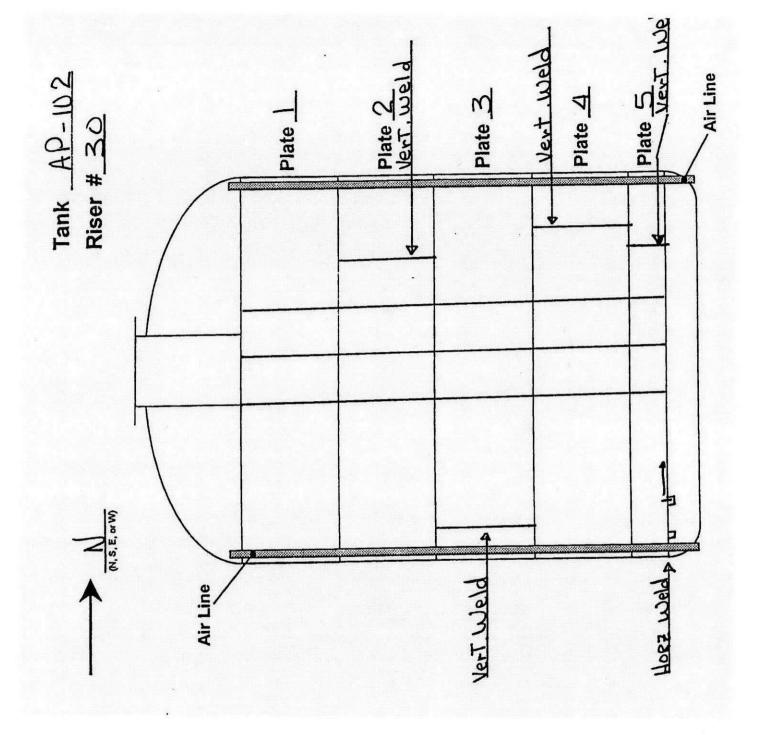
	AUTON	Job#		04-41		Riser #	100	0					
Location	1: 200 EAS	ST TANK FA	AP (Calibration Block:	44	14-99-3	0-00	1/002					
Procedu	re: COGE	MA SVUT-I	NS-007.	.3	Rev.	2	Thickness:		1.0"		aterial:	Carl	oon Steel
UT Syst	tem:	PSP-4	Serial I	No.	209/20	6	Reference Block: N/A						
Softwar	e Version:	P-SCAN	Sys. 4	1.3	Rev.	2	Thickness: N/A				Material: N/A		
Linearit	y Due Date:	03/08/	2005			T !	Reference	Block	(Temp:	AN	MB OF		
Scanne	r Type:	AWS-5d	Serial	No. 31	0		Couplant:	٧	Vater	В	atch No.		N/A
Scanne	r Cable:	COAXIAL					Cable Len	gth:		30 F	eet		
Signal (Cable:	COAXIAL					Cable Len	gth:		30 F			
Chann	ial lar	nsducer Make	Mode	el	Freq. (MHz)	T	Size		rial No.		e (deg)	Wedge Type	
1		КВ	MW	В	4	8x	9mm		3132		45		
2		КВ	MW	В	4	8x	9mm	0	3244		45		
3		KB	MW	В	4	8X	9MM	,	3142		45		
4		KB	MW	<u> </u>	4		9MM		3247		45		
	TIAL CALIB				—		IBRATIC						
DATE		01/03/05	01/03/05	5 01	/04/05	01/04/05	01/0	3/05	01/03	/05	01/04	/05	01/04/05
TIME:		1414	1930		0950	1353	12	46	1952		0936		1430
	ECTOR / NTATION:	.050* Notch	.050" Notch	The part of the last of the la	050" Notch	.050" Notch		.050" Notch		0" ch	.050" Notch		.050" Notch
CH. 1	AMPLITUDE	80%/0db	80%/1d	b 80	%/0db	80%/2dl	2db 80%/		80%/	1db			
Cn. i	LOCATION	1.414" 1.404"		1	.414"	1.423"	423" 1.41		1.414				
6 4.0	AMPLITUDE	80%/0db	80%/2d	b 80	%/0db	80%/2dl	80%	/Odb	80%/-	1db	80%/	Odb	80%/0db
CH. 2	LOCATION	1.414"	1.401"	1	.414"	1.413"	" 1.414"		1.424"		4" 1.414"		1.427"
CH. 3	AMPLITUDE	80%/0db	80%/0d	ь 80	%/0db	80%/0dl	db 80%/0db		80%/-1db				
Cn. 3	LOCATION	1.414"	1.417"	1	.414"	1.423"	1.4	14"	1.42	21"			
	AMPLITUDE	80%/0db	80%/0d	b 80	%/0db	80%/0dl	b 80%	/0db	80%/-	-2db	80%/	0db	80%/-2db
Un. 4	CH. 4 LOCATION 1.4		1.407"	1	.414"	1.410"	1.4	14"	1.43	34"	1.41	4"	1.434"
EXAM	EXAMINER: WHN		WHN	1	WHN	WHN	W	HN			WH	N	WHN
		Weld & Res		lorz. w					Review	er. V	V. H. Ne	elson	
	4) De	Da	ite:		_	(1/4) Level:	77	Jes	<u></u>				

Att. 2-58

	MOTUA	Job#		4-41		Riser#	30					
Location: 200 EAST TANK FARM System: 102-AP								444	1-99-3	0-001	/002	
Procedu	re.	MA SVUT-I	Rev		Rev.				1.0"		aterial:	Carbon Steel
JT Syste	em: P	SP-4	Serial No	0. 2	09/206/	405	Reference Block:				N/A	
Software	e Version:	P-SCAN	Sys. 4 1.	3	Rev.	2	Thickness	: ,	I/A	M	aterial:	N/A
inearity	Due Date:	03/01/					Reference			AN	1B °F	
Scanner	Type:	AWS-5d	Serial No	o. 31	0/309		Couplant:	w	ater	B	atch No.	N/A
Scanner	r Cable:	COAXIAL					Cable Len	igth:		30 F	eet	
Signal C	able:	COAXIAL					Cable Len	ngth:		80 F		
Chann	ol Tran	nsducer	Model		Freq.		Size	T sar	al No.	Angl	e (deg)	Wedge
	N	Make			(MHz)			-		1,000,000	1. / Act.	Туре
2		KB KB	MWB MWB		4	1	8x9mm 8x9mm		142 140	45		
3		NB	INIAAD				OXSTIIII	"	140		43	
4												
INIT	IAL CALIBR	RATION				С	ALIBRATIO	ON CH	ECKS			
DATE:		02/10/05	02/10/05	02	/14/05	02/14	/05					
TIME:		1238	2001		0835		9					
REFLECTOR / ORIENTATION:		.050" Notch	.050" Notch	100	.050" Notch		oh					
	AMPLITUDE	80%/0db	80%/1db	80	80%/0db		1db					
CH. 1	LOCATION	1.414"	1.401"	1	1.414"		4"					
CH. 2	AMPLITUDE	80%/0db	80%/2db	80	80%/0db		2db					
OI 1. Z	LOCATION	1.414"	1.414"	1	.414"	1.40	11"					
CH. 3	AMPLITUDE											
011.0	LOCATION											
CH. 4	AMPLITUDE										<u> </u>	
	LOCATION											
EXAMINER: WHN			WHN		WHN	WH	IN					
Rema	rks: L.P6					Wi	in					
Exam	iner: W.H.	Nelson		Examir	ner:					ver: V	V. H. No	elson
Level: <u>III</u> Date: 2/10&14/05 Level: Date:								Level: III Date: 31105				
COCEM	SVIIT INS OUT	3, Rev. 2, Attachn	neat 3				-					Rev. Dec. 03, 2

	AUTOM	Jobi		4-41		Riser #	30						
Location: System: 102-/							Calibratio Block:	n 44/	1-99-3	0-001	1002		
Procedure: COGEMA SVUT-INS-00				Rev Th			Thickness		1.0"		terial:	Carbon Stee	
JT Syst	em: P	SP-4	Serial N	No. 2	09/206	/405	Reference Block:	е			N/A		
Software	e Version:	P-SCAN	Sve A 1		Rev.	2	Thickness	s:	I/A		terial:	N/A	
inearity	y Due Date:			1.0	l		Referenc				D 0F	18/7	
Scanner	r Type:	03/01/	2005 Serial I	No.			Couplant				B ^O F		
	1	AWS-5d		31	0/309			W	ater			N/A	
	r Cable:	COAXIAL					Cable Le			80 Fe	et		
Signal C	Cable:	COAXIAL					Cable Le	ngth:		80 Fe	et		
Chann		nsducer Make	Mode	ei	Freq. (MHz)		Size	Seri	al No.		(deg)	Wedge Type	
1		КВ	MW	В	4		8x9mm	23	200	-	80		
2		KB	MW	В	4		8x9mm	23	029	6	30		
3		*KB	MW	В	4	4	8x9MM	23	3028		50		
4					l					١			
	TIAL CALIBI						ALIBRATION CHECKS						
DATE:		02/03/05	02/03/09			02/15							
TIME:		1227	1446		0842		7						
	ECTOR /	.050" Notch	.050" Notch		.050" Notch		on ch						
	AMPLITUDE	80%/0db	80%/2d	b 80	80%/0db		80%/1db						
CH. 1	LOCATION	2.000"	1.996"	2	.000"	1.97	'0"						
CH. 2	AMPLITUDE	80%/0db	80%/1d	b 80	%/0db	80%/	1db						
Cn. 2	LOCATION	2.000*	1.996"	2	2.000"	1.97	1.970"						
CH. 3	AMPLITUDE												
Cn. 3	LOCATION												
CH. 4	AMPLITUDE												
Cn. 4	LOCATION												
EXAN	INER:	WHN	WHN		WHN	W	IN						
	L.P7	00 used on	2/15/05										
Examiner: W. H. Nelson WH Nee				Examiner:					Reviewer: W. H. Nelson				
Level: III Date: 2/10&14/05					Level: Date:					Level: III Date: 3/1/05			
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Att. 2-60



February, 28th, 2005

Mr. Daron Tate COGEMA Engineering Corp. 2425 Stevens Center Richland, WA. 99352

This letter is to certify that I have analyzed the P-scan automated ultrasonic data from Hanford waste tank 241-AP-102. The data reviewed for the primary tank wall was collected by Mr. Nelson and Mr. Purdy November 18, 2004 through February 15, 2005. The data is acceptable. The data from the vertical walls, vertical welds and horizontal weld was analyzed to the requirements of COGEMA procedure SVUT-INS-007.3 Revision 2.

There are multiple areas that exceed the 10% wall-loss criteria in plates 1, 2, 3 and 4. Pitting and/or corrosion areas were detected in plates 1, 2, 3, 4, 5 and the bottom knuckle. Vertically oriented wall loss was noted in the second scan of Plate 5. Although the minimum thickness detected in this scan is just below the 10% reporting criteria, the orientation of the corrosion is noteworthy.

Other than the above areas, there are no reportable indications in any of the areas examined. No cracking or reportable pitting was detected in any of the areas examined.

James B. Elder ASNT UT Level III

CC: Mr. W. H. Nelson - COGEMA

ATTACHMENT 3

ULTRASONIC EXAMINATION OF DOUBLE-SHELL TANK 241-ÁP-102 EXAMINATION COMPLETED <u>FEBRUARY 2005</u> (PNNL THIRD PARTY REVIEW) This page intentionally left blank.

Ultrasonic Examination of Double-Shell Tank 241-AP-102 Examination Completed February 2005

AF Pardini GJ Posakony

March 2005

Prepared for the U.S. Department of Energy under Contract DE-AC06-76RL01830

Pacific Northwest National Laboratory Richland, Washington 99352

Summary

COGEMA Engineering Corporation (COGEMA), under a contract from CH2M Hill Hanford Group (CH2M Hill), has performed an ultrasonic nondestructive examination of selected portions of Double-Shell Tank 241-AP-102. The purpose of this examination was to provide information that could be used to evaluate the integrity of the wall of the primary tank. The requirements for the ultrasonic examination of Tank 241-AP-102 were to detect, characterize (identify, size, and locate), and record measurements made of any wall thinning, pitting, or cracks that might be present in the wall of the primary tank. Any measurements that exceed the requirements set forth in the Engineering Task Plan (ETP), RPP-22571 (Jensen 2004) and summarized on page 1 of this document, are reported to CH2M Hill and the Pacific Northwest National Laboratory (PNNL) for further evaluation. Under the contract with CH2M Hill, all data is to be recorded on disk and paper copies of all measurements are provided to PNNL for third-party evaluation. PNNL is responsible for preparing a report that describes the results of the COGEMA ultrasonic examinations.

Examination Results

The results of the examination of Tank 241-AP-102 have been evaluated by PNNL personnel. The ultrasonic examination consisted of two 15-in. wide scans (17-in. wide on shell course #1) over the entire height of the tank and the heat-affected zone (HAZ) of four vertical welds and one horizontal weld. The examination was performed to detect any wall thinning, pitting, or cracking in the primary tank wall.

Primary Tank Wall Vertical Scan Paths

Two 17-in. wide vertical scan paths were performed on shell course #1 and two 15-in.-wide vertical scan paths were performed on shell courses #2, #3, #4, and #5. The shell courses were examined for wall thinning, pitting, and cracks oriented vertically on the primary tank wall.

Shell course #1 results indicate three areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, these three areas (with remaining ligament of 0.440-in., 0.441-in., and 0.428-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. No vertical crack-like indications were detected in shell course #1.

Shell course #2 results indicate five areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, four of these areas (with remaining ligament of 0.440-in., 0.430-in., 0.438-in., and 0.416-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. One of the five areas was evaluated by the UT Level III and was considered wall thinning with a minimum thickness of 0.430-in. and does exceed the reportable level of 10% of the nominal thickness. No vertical crack-like indications were detected in shell course #2.

Shell course #3 results indicate six areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, these six areas (with remaining ligament of 0.489-in., 0.503-in., 0.506-in., 0.491-in., 0.505-in., and 0.506-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. No vertical crack-like indications were detected in shell course #3.

Shell course #4 results indicate no areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. No pitting or vertical crack-like indications were detected in shell course #4.

Shell course #5 results indicate no areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. No pitting or vertical crack-like indications were detected in shell course #5.

Primary Tank Wall Weld Scan Paths

The HAZ of vertical welds in shell courses #2, #3, #4, and #5 were examined for wall thinning, pitting, and cracks oriented either perpendicular or parallel to the weld.

Shell course #2 results indicate eight areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, all eight of these areas (with remaining ligament of 0.445-in., 0.426-in., 0.440-in., 0.424-in., 0.440-in., 0.430-in., 0.426-in., and 0.406-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. No crack-like indications were detected in the weld areas in shell course #2.

Shell course #3 results indicate no areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. No pitting or crack-like indications were detected in the weld areas in shell course #3.

Shell course #4 results indicate eight areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, six of these areas (with remaining ligament of 0.635-in., 0.640-in., 0.630-in., 0.641-in., 0.657-in., and 0.664-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. Two of the eight areas were evaluated by the UT Level III and were considered wall thinning with a minimum thickness of 0.651-in. and 0.656-in. and do exceed the reportable level of 10% of the nominal thickness. No crack-like indications were detected in shell course #4.

Shell course #5 results indicate no areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. No pitting or crack-like indications were detected in the weld areas in shell course #5.

The HAZ of the horizontal weld between shell course #5 and the tank knuckle was examined for wall thinning, pitting and cracks oriented either perpendicular or parallel to the weld. There were no areas of wall thinning that exceeded the reportable level of 10% of the nominal thickness. No pitting or crack-like indications were detected in the weld HAZ areas on shell course #5 side or on the knuckle side of the horizontal weld.

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1.0 Introduction

COGEMA Engineering Corporation (COGEMA), under a contract from CH2M Hill Hanford Group (CH2M Hill), has performed an ultrasonic nondestructive examination (UT) of selected portions of Double-Shell Tank (DST) 241-AP-102. The purpose of this examination was to provide information that could be used to evaluate the integrity of the DST. The requirements for the UT of Tank 241-AP-102 were to detect, characterize (identify, size, and locate), and record measurements made of any wall thinning, pitting, or cracks that might be present in the wall of the primary tank. Any measurements that exceed the requirements set forth in the Engineering Task Plan (ETP), RPP-22571 (Jensen 2004), are reported to CH2M Hill and the Pacific Northwest National Laboratory (PNNL) for further evaluation. Specific measurements that are reported include the following:

- Wall thinning that exceeds 10% of the nominal thickness of the shell course plate.
- Pits with depths that exceed 25% of the nominal shell course plate thickness.
- Stress-corrosion cracks that exceed 0.10-in. (through-wall) that are detected in the inner wall of the tank, heat-affected zone (HAZ) of welds, or in the tank knuckle.

The accuracy requirements for ultrasonic measurements for the different types of defects are as follows:

- Wall thinning measure thickness within ±0.020-in.
- Pits size depths within ±0.050-in.
- Cracks size the depth of cracks on the inner wall surfaces within ± 0.1 -in.
- Location locate all reportable indications within ± 1.0 -in.

Under the contract with CH2M Hill, all data is to be recorded on disk and paper copies of all measurements are provided to PNNL for third-party evaluation. PNNL is responsible for preparing a report that describes the results of the COGEMA UT.

2.0 Qualified Personnel, Equipment, and Procedure

Qualification of personnel participating in the DST inspection program, the UT equipment (instrument and mechanical scanning fixture), and the UT procedure that will be used in the examination of the current DST is required by CH2M Hill. Personnel participating in the examinations are to be certified in accordance with the American Society for Nondestructive Testing (ASNT) Guideline SNT-TC-1A-92 and associated documentation is to be provided. The capability of the UT system, personnel, and procedure is to be validated through a performance demonstration test (PDT) administered by PNNL on a mock-up simulating the actual DST. The current procedure for the UT is to be based on the Section V, Article 4, *Boiler and Pressure Vessel Code* defined by the American Society for Mechanical Engineers (ASME).

2.1 Personnel Qualifications

The following individuals were qualified and certified to perform UT of the Hanford DST 241-AP-102:

- Mr. Wesley Nelson, ASNT Level III (#LM-1874) in UT, has been identified as COGEMA's UT
 Level III authority for this project. Mr. Nelson has been certified by COGEMA as a UT Level III in
 accordance with COGEMA procedure COGEMA-SVCP-PRC-014, latest revision. Further
 documentation has been provided to establish his qualifications. Reference: Letter from PNNL to
 C.E. Jensen dated August 22, 2000, "Report on Performance Demonstration Test PDT, May 2000."
- Mr. James B. Elder, ASNT Level III (#JM-1891) in UT, has been contracted by COGEMA to provide peer review of all DST UT data. Mr. Elder has been certified by JBNDT as a UT Level III in accordance with JBNDT written practice JBNDT-WP-1, latest revision. Further documentation has been provided to establish his qualifications. Reference: PNNL-11971, Final Report Ultrasonic Examination of Double-Shell Tank 241-AN-107.
- Mr. William D. Purdy, COGEMA UT Level II limited (for P-Scan data acquisition only).
 Mr. Purdy has been certified in accordance with COGEMA procedure COGEMA-SVCP-PRC-014, latest revision. Further documentation has been provided to establish his qualifications. Reference: Letter from PNNL to C.E. Jensen dated October 5, 2001, "Purdy Performance Demonstration Test (PDT) Report."

2.2 Ultrasonic Examination Equipment

CH2M Hill has provided the UT equipment for the examination of Tank 241-AP-102. This equipment consists of a Force Technology P-Scan ultrasonic test instrument and a Force Technology AWS-5D and AGS-2 remote-controlled, magnetic-wheel crawler for examining the primary tank wall. Ultrasonic transducers used for the examinations are commercial off the shelf. The P-Scan ultrasonic system has been qualified through a PDT administered by PNNL. Reference: PNNL-11971, Final Report- Ultrasonic Examination of Double-Shell Tank 241-AN-107.

2.3 Ultrasonic Examination Procedure

COGEMA-SVUT-INS-007.3, Revision 2, outlines the type of UT and mechanical equipment that are to be used as well as the types of transducers. Both straight-beam and angle-beam transducers are used for the examination of the primary tank wall and the HAZ of selected primary tank vertical and horizontal welds. The examination procedures include full documentation on methods for calibration, examination, and reporting. Hard copies of the T-Scan (thickness) and P-Scan (projection or angle beam) views of all areas scanned are made available for analysis. The UT procedure requires the use of specific UT transducers for the different examinations. A calibration performed before and after the examinations ensures that each transducer used in the inspection is adjusted and that the entire system is performing correctly. The COGEMA UT procedure has been qualified through a PDT. Reference: PNNL-11971, Final Report - Ultrasonic Examination of Double-Shell Tank 241-AN-107.

3.0 Ultrasonic Examination Configuration

COGEMA is required to inspect selected portions of the DSTs which may include the primary and secondary tank walls, the HAZ of the primary tank vertical and horizontal welds, and the tank knuckle and bottoms. The P-Scan system has been configured to perform these examinations and has been performance tested. The examination of Tank 241-AP-102 included UT of the primary tank wall and the HAZ of selected welds in the primary tank wall.

3.1 Primary Tank Wall Transducer Configuration

Figure 3.1 provides an example of the scanning configuration generally used during an examination of the primary tank wall. However, other configurations can be used at the discretion of the COGEMA UT Level III (i.e., 45-degree transducers can be removed for simple wall thickness measurements). The functional diagram in Figure 3.1 shows one straight-beam and two angle-beam transducers ganged together for examining the primary tank wall. The straight beam is designed to detect and record wall thinning and pits, and the angle beams are designed to detect and record any cracking that may be present. These transducers are attached to the scanning bridge and they all move together. Information is captured every 0.035-in. (or as set by the NDE inspector) as the assembly is scanned across a line. At the end of each scan the fixture is indexed 0.035-in. (or as set by the NDE inspector) and the scan is repeated. The mechanical scanning fixture is designed to scan a maximum of 15-in. and then index for the next scan. The hard copy provides a permanent record that is used for the subsequent analysis.

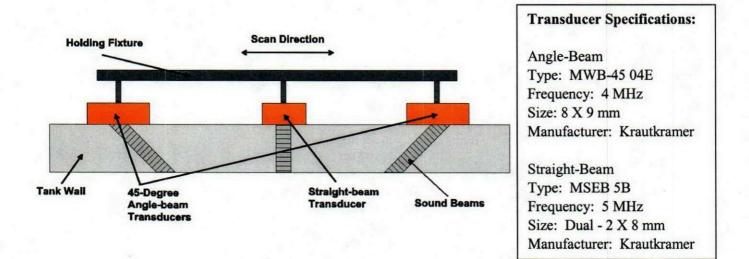


Figure 3.1. Transducer Configuration for Examining the Primary Tank Wall

3.2 Weld Zone Transducer Configuration

Figure 3.2 is a functional sketch that shows the configurations for examination of the weld zone. The area of interest (HAZ of the weld) is shown as lying adjacent to the weld. Both cracks and pitting may occur in this region. The "A" portion of this sketch shows the 60-degree angle-beam transducers used for detecting cracks parallel to the weld. The straight-beam transducers in this sketch are used for detecting and recording any pitting or wall thinning that may be present. All transducers are ganged together. The scanning distance traveled is limited to a total of approximately 5.0-in. The sketch titled "B" shows the arrangement for detecting cracks that may lie perpendicular to the weld. Four 45-degree, angle-beam transducers are used for this inspection. Again the transducers are ganged together but the scan is limited to a total of approximately 4.0-in. The weld zone requirements are shown in Figure 3.3. The scan protocol, data capture, and index are the same for examining other weld areas in the tank.

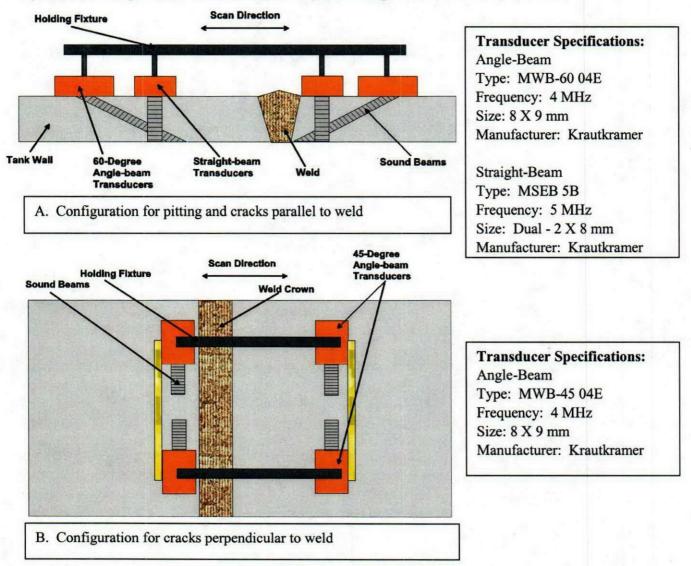
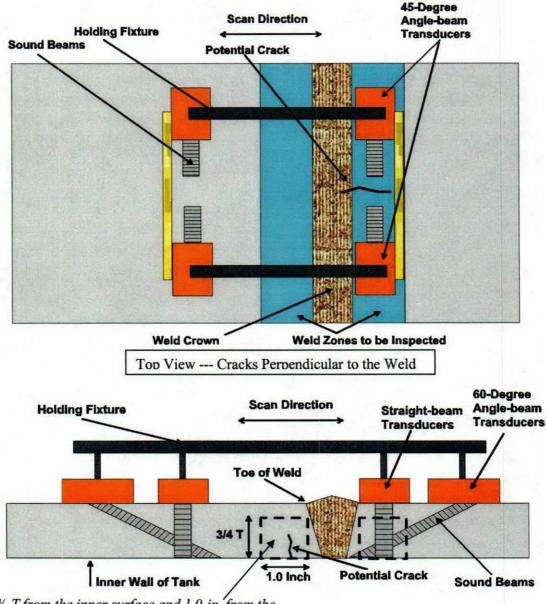


Figure 3.2. Transducer Configurations for Examination of Weld Zone in the Primary Tank Wall

In the HAZ, the requirement for characterizing cracks that lie perpendicular or parallel to welds in the primary tank wall is described in Figure 3.3. The HAZs are located on either side of the weld and defined as being within 1-in. of the toe of the weld and on the inner three-quarters of the thickness (3/4T) of the shell course plate. These zones are considered most likely to experience stress-corrosion cracking.



A zone ¾ T from the inner surface and 1.0-in. from the toe of the weld is to be ultrasonically examined for cracking, corrosion or pitting. Examinations are to be made on both sides of the weld.

Figure 3.3. Views of the Weld zone to be Ultrasonically Examined in the Primary Tank Wall

4.0 Ultrasonic Examination Location

Tank 241-AP-102 is located in the Hanford 200 East area in AP Tank Farm. The crawler and associated scanner that hold the transducers were lowered into the 24-in. riser located on the east side of 241-AP-102 and designated as Riser 30. Figure 4.1 provides a graphic of the location of this riser.

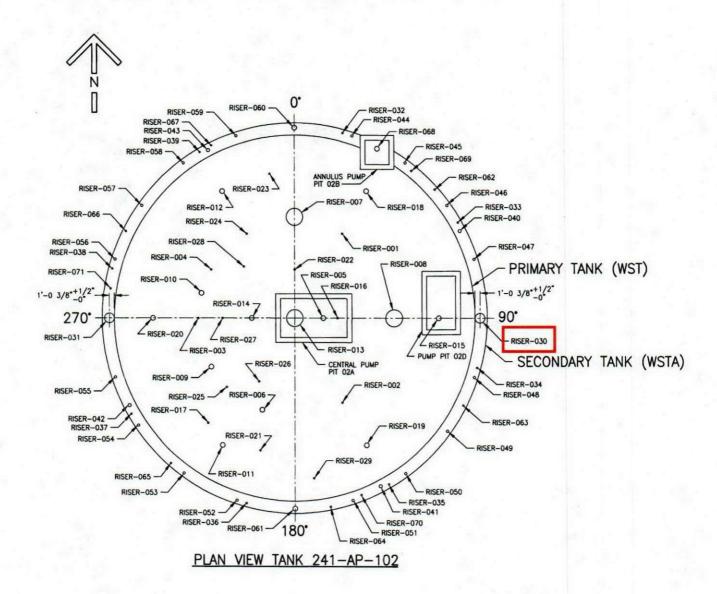


Figure 4.1. UT of 241-AP-102 from Riser 30

Figure 4.2 describes the areas on the primary wall of Tank 241-AP-102 that was ultrasonically examined. Two 17-in. wide vertical scan paths were performed on shell course #1 and two 15-in.-wide vertical scan paths were performed on shell courses #2, #3, #4, and #5 below the entrance to Riser 30. Vertical weld HAZ examinations were done on shell courses #2, #3, #4, and #5, and the horizontal weld HAZ examination was done on the transition shell course #5 to knuckle weld.

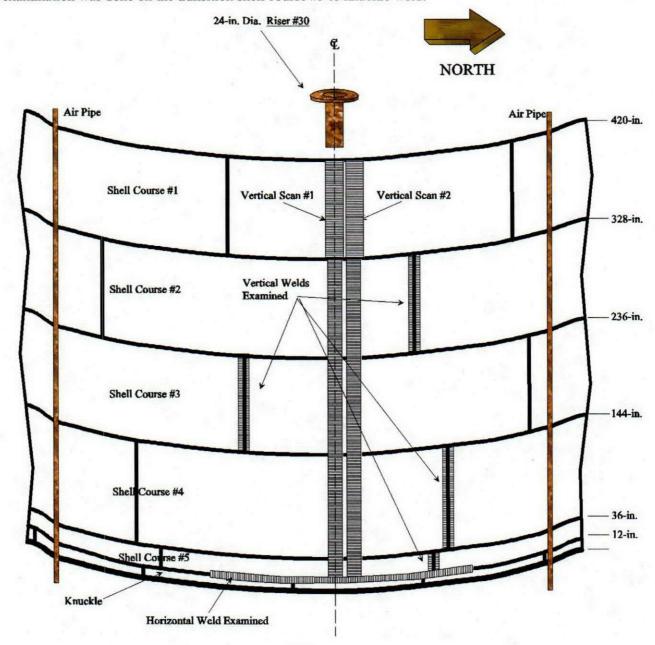


Figure 4.2. Sketch of Scan Paths on Tank 241-AP-102

5.0 Ultrasonic Examination Results

COGEMA has provided detailed reports including T-Scan and P-Scan hard copies of all areas that were ultrasonically examined to PNNL for third-party review. The data was analyzed by COGEMA Level III Mr. Wes Nelson and peer reviewed by JBNDT Level III Mr. Jim Elder. The results of the examination of Tank 241-AP-102 are presented in Figures 5.1 and 5.2.

Figures 5.1 and 5.2 show the wall thickness examination results for the primary tank wall and the HAZs of both vertical and horizontal welds. The examination consisted of two vertical paths beneath the 24-in. diameter riser. Vertical scan #1 was 17-in. wide on shell course #1 and 15-in, wide on shell courses #2, #3, #4, and #5 near the centerline of the 24-in. riser. Vertical scan #2 was adjacent to vertical scan #1 and was also 17-in. wide on shell course #1 and 15-in. wide on shell courses #2, #3, #4, and #5. The HAZs of vertical welds in shell courses #2, #3, #4, and #5 were examined and the HAZ in the horizontal weld between shell course #5 and the knuckle section was also examined. Weld area exams include approximately 5-in, on each side of the weld. Areas in the figures that show two measurements in the same box are the result of the vertical scan paths overlapping the horizontal HAZ scan paths. Figures 5.1 and 5.2 display the minimum readings taken in each 15-in. (17-in. for shell course #1) wide by 12-in. long area of the scan. In the overlapping areas, both minimum readings from each of vertical and horizontal scan paths are given. The gray highlighted areas indicate that the minimum wall thickness exceeded the reportable level of 10% of the nominal wall thickness. The green highlighted areas indicate that the minimum wall thickness exceeded the 10% level, but the UT Level III has characterized these as pit-like indications. None of these pit-like indications exceed the pitting criteria of 25% of nominal thickness and are therefore not reportable. One area on the knuckle side had a surface condition that limited data acquisition. This area is designated with a NR for "no reading".



Figure 5.1. UT Data from Tank 241-AP-102

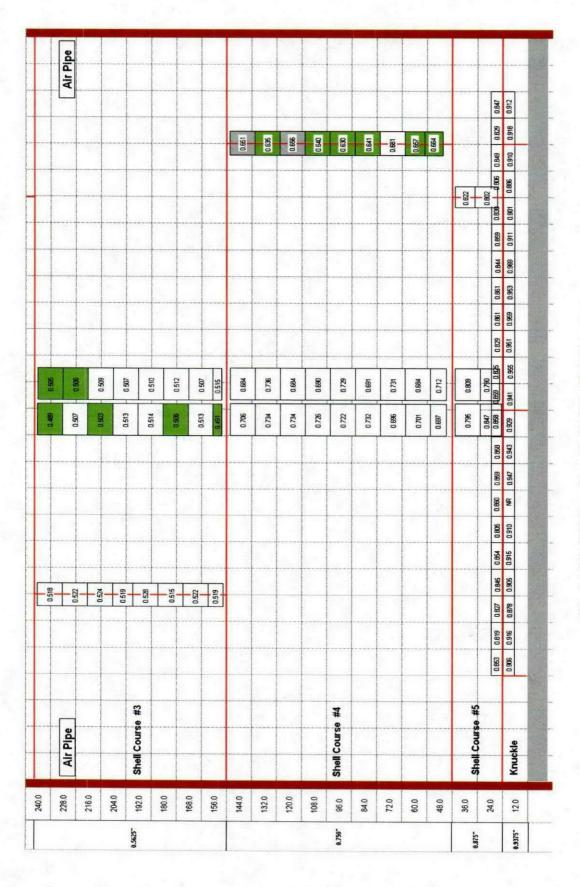


Figure 5.2 UT Data from Tank 241-AP-102 cont.

6.0 Conclusions

The results of the examination of Tank 241-AP-102 have been evaluated by PNNL personnel. The examination consisted of two 15-in. (17-in. wide on shell course #1) wide scans over the entire height of the tank and the HAZs of 4 vertical welds and 1 horizontal weld. The examination was performed to detect any wall thinning, pitting, or cracking in the primary tank wall.

6.1 Primary Tank Wall Vertical Scan Paths

Two 17-in. wide vertical scan paths were performed on shell course #1 and two 15-in.-wide vertical scan paths were performed on shell courses #2, #3, #4, and #5. The shell courses were examined for wall thinning, pitting, and cracks oriented vertically on the primary tank wall.

The nominal thickness of shell course #1 is 0.500-in. Shell course #1 results indicate three areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, these three areas (with remaining ligament of 0.440-in., 0.441-in., and 0.428-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. No vertical crack-like indications were detected in shell course #1.

The nominal thickness of shell course #2 is 0.500-in. Shell course #2 results indicate five areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, four of these areas (with remaining ligament of 0.440-in., 0.430-in., 0.438-in., and 0.416-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. One of the five areas was evaluated by the UT Level III and was considered wall thinning with a minimum thickness of 0.430-in. and does exceed the reportable level of 10% of the nominal thickness. No vertical crack-like indications were detected in shell course #2.

The nominal thickness of shell course #3 is 0.5625-in. Shell course #3 results indicate six areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, these six areas (with remaining ligament of 0.489-in., 0.503-in., 0.506-in., 0.491-in., 0.505-in., and 0.506-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. No vertical crack-like indications were detected in shell course #3.

The nominal thickness of shell course #4 is 0.750-in. and the minimum thickness in this area was 0.684-in. Shell course #4 results indicate no areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. No pitting or vertical crack-like indications were detected in shell course #4.

The nominal thickness of shell course #5 is 0.875-in. and the minimum thickness in this area was 0.790-in. Shell course #5 results indicate no areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. No pitting or vertical crack-like indications were detected in shell course #5.

6.2 Primary Tank Wall Weld Scan Paths

The HAZ of vertical welds in shell courses #2, #3, #4, and #5 were examined for wall thinning, pitting, and cracks oriented either perpendicular or parallel to the weld.

The nominal thickness of shell course #2 is 0.500-in. Shell course #2 results indicate eight areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, all eight of these areas (with remaining ligament of 0.445-in., 0.426-in., 0.424-in., 0.424-in., 0.440-in., 0.430-in., 0.426-in., and 0.406-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. No crack-like indications were detected in the weld areas in shell course #2.

The nominal thickness of shell course #3 is 0.5625-in. and the minimum thickness in this area was 0.515-in. Shell course #3 results indicate no areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. No pitting or crack-like indications were detected in the weld areas in shell course #3.

The nominal thickness of shell course #4 is 0.750-in. Shell course #4 results indicate eight areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. However, six of these areas (with remaining ligament of 0.635-in., 0.640-in., 0.630-in., 0.641-in., 0.657-in., and 0.664-in.) were analyzed by the UT Level III and were considered pit-like and therefore do not exceed the reportable pitting level of 25% of the nominal thickness. Two of the eight areas were evaluated by the UT Level III and were considered wall thinning with a minimum thickness of 0.651-in. and 0.656-in. and do exceed the reportable level of 10% of the nominal thickness. No crack-like indications were detected in shell course #4.

The nominal thickness of shell course #5 is 0.875-in. and the minimum thickness in this area was 0.802-in. Shell course #5 results indicate no areas that exceed the minimum thinning reportable level of 10% of the nominal thickness. No pitting or crack-like indications were detected in the weld areas in shell course #5.

The HAZ of the horizontal weld between shell course #5 and the tank knuckle was examined for wall thinning, pitting and cracks oriented either perpendicular or parallel to the weld. The results indicated that the minimum thickness in the weld area with nominal thickness of 0.875-in. on shell course #5 was 0.805-in. The minimum thickness in the weld area with nominal thickness of 0.9375-in. on the knuckle was 0.878-in. There were no areas of wall thinning that exceeded the reportable level of 10% of the nominal thickness. No pitting or crack-like indications were detected in the weld areas on shell course #5 side or on the knuckle side of the horizontal weld.

7.0 References

Jensen, C. E., 2004, Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks FY2005, RPP-22571, Rev 0, September 2004, CH2M Hill Hanford Group, Inc., Richland, Washington.

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